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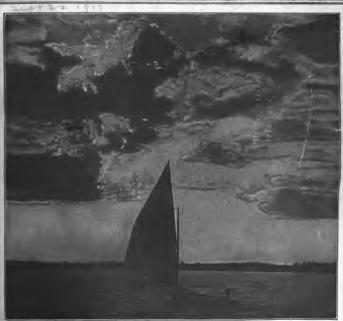
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PRINCETIN N WEEKLY

Vol. 9, No. 1

MARCH 17, 1919

10 CENTS A COPY



THE CALL OF THE AIR

FOLIRTH ANNIVERSARY NUMBER Degree Goog

The Christmas Bullet For Mining Transportation



MANY mines are so located that to get the precious metal or stones to market by transportation on the surface of the earth requires slow and expensive round-about travel.

For such mines the most efficient means of transport is the airplane — particularly the Christmas Bullet. The strutless, flexible wings of this biplane make it at once the speediest, safest and most easily controlled of all airplanes. For particulars write to the

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Dope Resisting Paint Aeroplane Dope Pigmented Varnish



Vot. IX

MARCH 17, 1919

No. 1

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VOL. IX

NEW YORK, MARCH 17, 1919

NO. 1

Aerial Age's Fourth Anniversary As A Weekly

O-DAY ARMAL Age celebrates its fourth birthday as a weekly magazine recording the latest developments in aeronautics throughout the world. We believe that our four years of existence has done much to broaden and elevate the business and to increase interest in and respect for the aeroplane and internal combustion engine as an adjunct of modern warfare, and as a medium of speeding up commerce

and the intercommunication of nations.

ABRIAL AGE was established to help pull American aeronautics through those "Dark Ages" when Congress was allowing only about \$100,000 a year for aeronautics. Half of that sum had to be spent in maintenance and it took a whole lot of energetic workers to create public interest to force Congress to give more and to enthuse a few sportsmen to purchase aeroplanes for sport.

It required courage to adopt the name AERIAL AGE. At that It required courage to adopt the name ARMAL AGE. At that time the possible value of aeroplanes for military purposes was still a matter of opinion—and the general opinion was that aeroplanes could not be more than scouts. It was held that aeroplanes could not be used for effective offensive and defensive because the recoil of a gun or the dropping of a bomb large enough to do damage would upset them

The possibility of large aeroplanes equipped with two so the wings of the aeroplanes must increase in proportion to the signs of the aeroplanes must increase in proportion to the span of the wings; 2, that a machine equipped with two motors would spin around out of control as soon as one of

the motors stopped. The very term "factor of safety" was unknown at the time

and every machine built was an experiment.

AERIAL Age was established in March, 1915. Clouds from the war storm which was raging in Europe were beginning to darken America's horizon and energetic work was necessary to awaken this country to the need of aerial preparedness on a large scale.

The United States Army and Navy combined had less than fifty aviators, including those in charge of the administration the Aviation Section. There were no dirigibles or kite

balloons in either the Army or Navy.

The aeronautic industry consisted of a handful of coura-

geous pioneers who had and were doing business at a loss. Congress had only allowed \$300,000 for Army aeronautics and \$1,000,000 for Navy aeronautics. The Allied countries and \$1,000,000 for Navy aeronatures. The Allied countries were ready to give substantial orders, but they would only place orders for prompt deliveries, and as the manufacturers were not in a position to deliver, they would not place the

The editors of AERIAL AGE realized that the war would be The editors of Arana. Act, realized that the war would be decided in the air; and that it was essential for the security of the United States to develop a substantial aeronamic into the control of the American manufacturers and prospective manufacturers the American manufacturers and prospective manufacturers the needs of the Allies, It meant more than publishing a good national technical and trade journal well—it meant also the shaping of courses of events in the industry, the directing of purchases and arranging the financing of manufacturers, and lathering the young industry in a general way, supplying speakers and moving pictures; supplying 'pen pictures' of the status of different aspects of aeromanties to government. officials, etc.

To do this AERIAL AGE had to establish four separate de-partments, one to do the national defense work, one to do the "Service and Advisory" work, one to do the regular work of publishing a national technical and trade journal and one to run a "photo and news service," to supply the aeronautic movement and the press and public with special aeronautic information and educational material.

These four departments have been maintained throughout these years and have rendered invaluable services to Country, to the Aeronautic Industry and to the Aeronautic Movement in general.

With a glanee backward, over a year of constructive service, AERIAL AGE looks forward to even greater opportunities for its Fourth Year.

Secretary Roosevelt Demands that America Be Made First in the Air

STANDING in the cockpit of a Handley-Page bombing plane and addressing an immense crowd in the Aeronautical Exposition at Madison Square Garden, Franklin D. Roosevelt, Assistant Secretary of the Navy, insisted upon America gaining supremacy of the air not only for defence in event of possible future conflict but for commercial and traveling purposes as well.

While he told of America having originated the science of flying, only to have other countries take its development and control out of her grasp, a De Haviland aeroplane, manned by two American pilots, sailed over the roof of the Garden, its manœuvres directed by wireless telephony, an aerial device also produced by American genius. In the rear of the Garden auditorium the voices of the pilot aloft and of the man directing his operations from the roof could be heard through the amplifier which megaphoned the communications.

amplifier which megaphoned the communications,
"The people of the country have a right to say to the Government that the United States shall remain in the van of
aircraft production and enterprise," said Mr. Roosevelt, "thut
only the interest of the people and its cooperation will make
such possible. This exposition shows the future possibilities
of aerial navigation, but a united public, thoroughly interesting
the control of the production of the control of the co of acrial navigation, but a united public, thuroughly interested must back up the manufacturers if America is to keep pace must be a propertied of the properties of the prope

(Continued on page 23)

AERO CLUB OF AMERICA COMMENDED BY ACES JUST RETURNED FROM FRANCE AS AIRMEN'S BEST FRIEND IN MEMORABLE RESOLUTION

WENTY-FOUR American aviators, headed by Lieut, Col. Thaw, dean of American aviators; Capt. Edward V. Rickenbacker, American Ace of Aces, and Capt. Reed Jean Landis, who has twelve Germans to his credit ansk neat to Capt. Rickenbacker as leading Ace of Aces, and including a large number of the most prominent officers from overseas, surprised Mr. Alan R. Hawley, the President, and other officers of the Acro Club of America on March 10, by presenthem with the following hearty resolution, expressing their opinion of the club's great work for aerial preparedness and the substantial help given to aviators.

Resolution reads as follows:

Whereas the Aero Club of America has, since its foundation in 1905, been the airman's best friend and is to-day the mainspring of the seronautic movement in this country;

Whereas before the war Amercan aeronautes was supported mainly by the Aero Club of America's activities; and Whereas before America's entry in the war, when the U. S. Army and Navy had less than thirty aviators, the Club, guided by its extraordinary foresight and splendid patriotism undertook to train aviators and form serial reserves; and through these efforts succeeded in training Lafayette Phijms Corps and the others were commissioned in the Army and Naval Reserves, which were authorized by Congress and organized by President Wilson, upon the recommendation and urgings of the Club, and were the first A. E. F. aviators to be sent overseas; and

Whereas the pioneer work of the Club in creating college aeronantic units and fostering interest in aerial preparedness in colleges and universities in 1915, 1916, 1917, and its helpful advice and guidance were directly responsible for bringing thousands of college men into the Air Service; and

Whereas before and after America's entry in the war the Club, by means of energetic national campaigns was responsible for securing large appropriations for military and naval aeronautics and urged unfalteringly the adoption of adequate plans for acrial preparedness; and

Whereas the Club heartily supported the work of the Lafayette Escadrille and Flying Corps, which were or ganized and supervised by Major Edmund Gros and Lieut. Com. F. H. Allen and generously supported by Mr. W. K. Vanderbitt, all members of the Club; and

Whereas, through its generous offer to pay the salaries of flight surgeons when there was no provision for same, the Club was 15 Army Air Service, which, when put in operation, resulted in saving hundreds of lives of aviators; and

Whereas the Club organized a Foreign Service Committee in Paris, composed of prominent Americans, members of the Club, residents of Paris, whose high standing in France and personal knowledge of the country enabled them to be of great assistance to American avaitors at the front and elsewhere, and visited the American aeronautic centers in France and supplied them as well as aero quadratic parts.

The Resolutions were signed by:

rons at the front with magazines, books, athletic equipment, tobacco and other needs, which greatly added to the personal comfort and well-being of the aviators; and

Whereas the Club noon after America's entry in the war, when there were no American decorations to be awarded for distinguisted, senece, to the control of the control of the Honor and Merit and Diploma to be awarded for distinguished service; thereby being the first national American body to express in a tangible way the appreciation of the American nation to those who fought at the front for civilization and humanity; and

Whereas, it was the Club's efforts that kept the aviators flying pay from being abolished during the war; and

Whereas during the war the Club, with rare kindness and sympathy, sought to comfort the parents of the aviators who lost their lives or met with accidents, and with great trouble found and supplied information to parents regarding the whereabouts of their sons who were in the Air Service; and

Whereas the Club had created The Airmen's Memorial Fund, for the purpose of erecting a suitable memorial to the airmen who have died and has taken other steps to honor and perpetuate the names of the airmen who fought and died for the cause of humanity and civilization; and

Whereas the employment of aircraft for general purposes has been advanced at least one year because the club had the foresight to make plans for the employment of aircraft for transportation, sport, scientific and civil purposes; and

Whereas the Club contributed and is contributing in many other ways not made public and not mentioned herewith to the upbuilding of our Air Forces, to the attaining of the final victory over Germany and her allies, and to the placing of American aeronautics on a sound, permanent basis;

Be It Resolved that we among the hundreds of others have seen the great value of the Club's inspiring patrioism, progressive work and liberal contributions, herewith express our heartfelt gratitude; and be it further

Resolved that we hereby pledge our hearty support to the Club and its great work; and further

Resolved that a copy of these resolutions duly engrossed be transmitted to each and every member of the Board of Governors of the Club and the Chairman of the Committees and those members of the Club and cooperating organizations who have contributed to the club's splendid

Lieut. Col. William Thaw, dean of American aviators; Geo. A. Vauglen, who has ten German machines to his credit; R. S. Landis, son of Judge Landis, with twelve machines to his credit; Capt. Edward V. Rickenhacker, American Ace of Aces; Major Melvin Hall, A. S. A.; Major Cushman Rice, U. S. Air Service, who was in command of the first three Air Squadroms to go overseas; Capt. Herbert S. Mapes, A. S. A.; Lieut. Samuel Mustain, A. S. A.; Capt. Hobert A. Bartlett, Army Transport Service, Leiten. Granville A. Pollock, one of the members of the Lafayette Exadrille, now in the U. S. Air Service; Captaina Lahoulite, French Ace representing the French spectrum; Captaine de Frennestame, of the French Army; Lieut. Col. Isaac Jones, of the saff of Brig. Gent. T. C. Lyvett, Medical Corps, Air Service; Major Louis Fisher, Medical Corps, Air Service; Capt. A. J. Boyrivan, French Flying Corps; Ensign D. E. Huger, U. S. N., of the Lafayette Exadrille; Wainwright Abbott, French Flying Corps; Capt. M. Yorsaf, of Gustemal; Ensign T. I. Turner, Ensign C. J. Coatsworth, Jr., U. S. N.; George E. Turnure, Jr. (Lafayette); Lieut. Raymond N. Betey, of the 50th Aero Squadron.

(Continued from page 21)

see to it that the Government adopts a definite policy toward the control of the air and the control of building and the

the control of the air and the control of building and the cooperation—the friendly cooperation—of the people who are building and of the people who are using private planes. "Once upon a time, not so very long ago, the United States discovered how to fly, but during the intervening years other tuations of the world took up our inventions, and four years ago-even two years ago-they knew a lot more about it than

we did, and had done a lot more. But to-day we have got back on even terms, and the question now is, are we going to fall behind again in the race? I have been over on the other side just lately and have seen preparations in England, France and Italy for the development of use of the air, and I must say it is time we need in addition to the efforts of all these manufacturers represented at this exhibit the hearty cooperation and interest of the American public in the promotion of air endeavors."

ADMIRAL SIMS' APPRECIATION OF WORK OF NAVAL AVIATORS

DMIRAL SIMS, Commander of the United States DMIRAL SIMS, Commanues of his sent the following radiogram to Mr. Alan R. Hawley, the President of the Aero Club of America:

"Please express to the Naval aviators of America my most sincere appreciation of their courageous and loyal performance of Duty at home and abroad throughout the war. Their brilliant exploits, their determination to win,

will ever remain one of the highest tributes to American manhood. The performance of duty of those young naval aviators under my command has not only been in keeping with the very best traditions, but won for America the en-thusiastic praise of her Allies."

The radiogram was in answer to a cable sent to Admiral Sims by the Aero Club of America, asking for an expression of appreciation from him regarding the work done by Ameri-

can naval aviators

EXTENSIVE CONTESTS DURING AERONAUTIC CONVENTION AND EXPOSITION AT ATLANTIC CITY, MAY 1st TO JUNE 1st

line.)

GREAT enthusiasm and hope for American aeronautics has been created by the Aero Club of America's announcement that the first aerial meet and contests to be held since the beginning of the war and the first dirigible races and kitch balloon contests ever held will be held at Atlandard tic City during the Second Pan-American Aeronautic Convention and Exposition, the program of which is printed elsewhere in this number of AERIAL AGE.

The contests, which are sanctioned by the Contest Committee of the Aero Club of America, under the rules of the International Aeronautic Federation, which govern all aerial contests, are as follows:

The Valentine Efficiency Marine Flying Contest

The prizes Awarded under the terms of the Samuel H. Valentine will are to be awarded for the greatest number of the Samuel H. Valentine will are to be awarded for the greatest number of the Steel Pier, Atlantic City, as starting point and Cape May Naval Air Station as turning point, during the five Saturdays of the Convention:

First Prize. \$1,000 Second Prize. 500 Third Prize. 250 Fourth Prize.....

The race is to start at 10 A. M. and last until 5 P. M., each of the five Saturdays in the month of May.

The laps start and end at the Steel Pier. Only complete laps count

Curtiss 1,000 Miles Non-Stop Seaplane Contest

Mr. Glenn H. Curtiss has offered a prize of \$1,000 to go to the first entrant for the Curtiss Marine Flying Trophy who covers the distance of 1,000 miles without stopping. The contest for this prize will open on May I and continue until it has been accomplished.

mas ocen accomplished.

The entrants who wish to compete for this prize during the Convention can fly over the (0) miles course between the Steel Pier and Cape May Air Station, and can compete for the Valentine Efficiency Marine Flying Prizes at the same

The entrant's record will be counted as a flight for the Curtiss Marine Flying Trophy under the rules for the 1919 competition for this trophy.

Open Seaplane Speed Contest (with handicap) for 42 laps of 5 miles each. To be held on Decoration Day, May 30.

First Prize.....\$1,000

Dirigible Speed Contest (with handicap) for the Aerial League of America Silver Trophy

This company of America Silver Fephy 19 The Account of March 20 The Account of

The names of the members of the winning crew of each race will be inscribed on the trophy, which is to be competed for annually.

The race will be for the best speed (under the conditions of the handicap) made at each race.

Aerial Commuting Prizes

(1) To be awarded to entrants who cover the greatest total distance in commuting by air from anywhere to Atlantic City during the period of the Convention.

First Prize......Gold Medal Second Prize....Silver Medal Third Prize.....Bronze Medal (Distance to be measured in straight line,)

(2) To be awarded to entrants who make the greatest number of trips in commuting by air from anywhere to Atlantic City during the period of the Convention.

First Prize......Gold Medal Second Prize....Silver Medal Third Prize.....Bronze Medal

(3) To be awarded to entrants who make the longest flight in commuting from anywhere to Atlantic City during the period of the Convention. (Distance to be measured in straight

First Prize, Gold Medal Second Prize, Silver Medal Third Prize, Bronze Medal

Intercollegiate Seaplane Speed Race Over a five-mile course, for the \$2,000 Intercollegiate Trophy,
This event is open to graduates and under graduates whether in military or civilian life.

Intercollegiate Land Aeroplane Speed Race

To be held on Decoration Day for the \$2,000 Intercollegiate Trophy.

This event is open to graduates and under-graduates whether

in military or civilian life. Army, Navy and Marine Corps Contest for Accuracy in Bomb Dropping on a Floating Target

This contest is to be held every Saturday during the Con-

vention and on Decoration Day.

Both land machines and seaplanes are permitted to compete, but slow machines must fly higher than fast machines, to equalize the chances of hitting the target.

First Prize......Gold Medal Second Prize....Silver Medal Third Prize...Bronze Medal

Woodhouse.



THE NEWS OF THE WEEK



Informal Wor Contracts Adjustment Bill Washington - Progress of the Contract o

Swedish Postmaster General Flies from Washington to New York
Julius Jublin, the Postmaster General of
Sweden, who is making a study of the postal
service of the United States, and who is especially interested in the air mail service, flew as
a passenger in the air mail plane from Wash-

ington to New York, leaving at 11.30 and arriving at New York at 2.30, with Pilot Robert Shanks.

Shanks.

Second Assistant Postmaster General Otto Praeget with his air mail staff, J. B. Corridon, L. T. Bussler, J. C. Elgerton and J. A. Jordan, left by train to join the Swedish Postmaster General at the Aeronautic Exhibition at Madison Square Garden on March 10, "Air Mail Day."

Square Leaders on March 10; "Air Mad Day."

Navy Planas Ply from New York to Mauptan

Norfolk, Va., March ; "—Four Navy armobanes which left New York City at 10a; "OttoBanes, Blangton Roads; early in the affertence.

Base, Blangton Roads; early in the affertence and all of shown

Lead plane carried and programments.

The form plane arrived nearly forty minutes

eaglet mustres sooner than the first one was due

at the Navad Base.

cright minutes somer than the first one was die at the Naval Bare and the Naval Bare at the Naval Nava

of which Urville Wright is a director and con of which Urville Wright is a director and con-sulting engines. Henry Woodhouse, a director of the Aero Club of America, pronounced the flight "most signifi-cant." Records not heing available at the time, he could not say whether a record for distance had here established, but he heltered it was a speed record for cross-country flight.

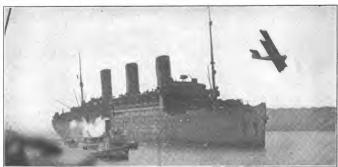
Planea Directed By Radio Talephone Over Armory

Plants Directed By Raulo Talepheno Over New York, N. 2002. No. 1997. The preparation of Masor Heavy J. Miller, a squadeon of four Nitip phene amounted over Madons Square deer transmitted by radio telephone from the transmitter and receiver was used, in chaige of Leatenant V. C. Shangaw, the squadeon of leatenant V. C. Shangaw, the squadeon of Leatenant V. C. Shangaw, the squadeon of the state of the control of the state of the control of the state of the control was not been stated by the state of the state

telephone and telegraph sets, and several new-paper men, appearance to the telephone and telephone and able to communication and commands had to be repeated several times. Messages from the planes, telephone-ter, came in very strong. The planes circled the commands of the officers and visitors to the installation. Voice-commanded flights were con-tinued throughout the exposition.

Aerial Photo Map of New York Made By Army New York, N. Y. A. a speed test in aerial pho-tography, unique in New York history, was made on March 8 when an army photographic plane on March 10 when any photographic plane Mirroda Aviation Field, at 1. o'clock flew over the city, photograph Madison Square Garden of interest pages of the control of the property of the control of the property of the control of the property of the control of interest pages.

the re-spaper offices, and various other points of interest, honographic plates were runded by performanced Exposition in the Statyminth Regiment Amory where the army exhibit of the Aeronautical Exposition is boused, for developing inside the control of the con



The Leviathan, with New York troops on board, being excerted up the North River by flying boat

25

Kenly and Crowell Fly to see Show In Major General William L. Kerdy, with Major General William L. Kerdy, with Major Water Show In Major General William L. Kerdy, with Major Major General Responsive of Parties of Major Sangar Genden in a Barbarian of Madion Source Gorden in a General Water Sangar Sanga the crowds at the Armory from a platform

Augustus Pest Reveals Caproni Plans

Assessing Pears Reveals Cappend Plans
Cappend has agreed a contrast to carry passengers and mail between Portugal and Brazil, and
Date Services of the Arce Chile, and at Amy
Oyant's Studies, 7s. West Privisith Street, on
It was a hearist to boy musical institute
of Rahaway, N. J.
Julia believe the armitted was aspend, Mr. Post
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The Percha

mercu in the United States, as in France.

General Treah Detends Air Service Before
Washington, D. C.—Major General Peter E.
the Argonic Sphing, in Testimory Before to House Roles Committee, derived the waste of taken on February 20, was as follows:

In the Command of the air at the Jates of Argonic, and the command of the air at the Jates of Argonic, and Representative Carrett, of Tennessee. "What "You must predict what the waste of Argonic, and Representative Carrett, of Tennessee. "What "You must predict what the waste of Argonic, and Representative Carrett, of Tennessee."

about that?"

"You must realize what that battlefront was,"
said General Traub, "You cannot have planes
said General Traub, "You cannot have planes
There is no power on God's carnt hat can protect one against an individual plane. They fly
high, perhaps not of sight in the fog or above
stight, perhaps not of sight in the fog or above
utes, fire, observe, and then awoup lack again,
All we can do is to report that there is a plane,
and for protection, and our planes go out and do
exactly what the German plane has donn."

"Can the criticium properly be made and be unstanced, that the German dominated the arr at "No, sir," replied General Trash. "At times whole spead of the Trash. "At times whole spead one what the higher command throught as "The you found no culpable negligence in a shorage of aeroplanes" asked Representative Harrason, of Missesseps. "No," and General Trash.

Two Air Records Smesshed By American-Built Plane
Washington — Establishment by an American Mushington — Built-Built Plane
Washington — Establishment by an American American Mushington of the State of

52 seconds.
52 seconds.
52 seconds.
53 seconds.
54 seconds.
55 seconds.
55 seconds.
55 seconds.
55 seconds.
56 sec in offering its hard-wood in such a way t market for hard-wood lumber will not be disturbed.

N. Y. to Washington By Air in 80 Minutes Washington, Narch 6.—After smishing all previous Bying records between Washington and the state of Military Aronautics and Laguet of the Bursan of Military Aronautics and Laguet the Bursan of Military Aronautics and Laguet the State of t

The Aeroplane in Agriculture
 In connection with scouting and other survey
 work in Texas the United States Department of
 Agriculture is putting the aeroplane to its first

practical application in agriculture. A try-out of the Trailty River and resulted in the dissovery of several outlew cotton feelibs in heavy tunber, of or several outlew cotton feelibs in heavy tunber, year the aeroplane is to be used more extensively, the skeep fround a valuable aid in pink followers when the property of the property of the property of the means of photographs, of the quarantimed retri-tory, and fastituse the inspection work in of country as the valley of the Rio Grande and is turbutaries.

to the control of the

Reporter-Lieutenant Flies to Aero Show Leaving Boston at 9.50 A. M. in a Whitte-more Hamm machioe, Aviation Lieutenant Theo-dore Hedhind flew to New York, arriving before

dore Hedlind flew to New York, arriving before 2 o'clock.

The flier is covering the Aero Show for the Boston Past. Ilis machine is a new model, built too late to be used in the war. Lieutenant Hedlind saw active service in France, being attached to a squadron engaged in night bombing behind the German lines.



American Aces back from France. Left to right: Capt. Roscor Fawcett, of Fortland, Oregon; Capt. James Narmel Hall, of Colles, towar, Mejor Kenneth P. Littauer, of Washington, D. C; Liesut, Cel. H. E. Hartsey, ef Washington, D. C., and Capt. Benjamin P. Harwood, of Billings, Mont, ell oil whom returned en the S. S. Mauretania. Members of the flying corps



The AIRCRAFT TRADE REVIEW



Porter Opens New York Office

Petre Open New York Office

Byton, Olha-Pailer R. Petre, who completed the Petre Petre Petre, who comArrosanies on March Ist, will open headquest
Arrosanies on March Ist, will open headquest
March the R. B. Petrer, his one, will be assocated with him in his future glans. Mr. PetMarch the R. B. Petrer, his one, will be assotated with him in his future glans. Mr. Petre

heavy engine for transations they had after

again to be production of the F. K. F. car

and the petron of the petrological state of the petrological

the Barcan of Asternit Production for the last

ten nomina as their moore engineer.

Commercial Treaties With South America

Commercial Treaties With South America Washington, March 3.—The United States is negotiating with the constructors of Latin Control Co

Aluminum Production Falls 10 Per Cent

Aluminum Production Falia 10 Per Cent Washington, March 4.—Aluminum production in 1918 was valued at \$41,159,225, a decrease of \$4,722,775, or 10 per cent from the value in 1917. The decrease is due very largely to a deline in the price of that until during 1918, and does not represent a corresponding decline in quantity of output.

Sperry Wanta Enemy Gyroscope Patenta

Washington, March 1.—The Sperry Gyroscope Co., Brooklyn, has asked the Federal Trade Com-nission for licenses to use nine alleged enemy patents covering the manufacture of gyroscopic aparatus. The commission is considering the application.

application.

Stromberg Extra Dividend

The Stromberg Motor Devices Co., Chicago, has declared an extra dividend of 25 centa a share in addition to the regular quarterly dividend of 75 centa a share, payable April 1st, to stockholders of record March 15th.

Texas to Have Aeroplans Company

Dallas, March 5.—Incorporation papers of the Texas Aeroplane Manufacturing Co. will be filed soon. The compaoy will have a paid-up capital stock of \$1,000,000, and its purpose is to construct and operate no aeroplace manufacturing plant here Lt. C. G. Taylor, of Lexington, Ky, 1s chief promoter of the project.

New York S. A. E. Visits Splitdorf Plant New York, March 5.—The Splitdorf Plant New York, March 5.—The Splitdorf Electrical Co. invited the Metropolitan Section of the S. A. E. to make an inspection trip through its plant in Newark on March 7th. Automobiles met the party at the station and entertained them at luncheon.

Curtisa Future Plans Beaad

With the transition from a war to peace basis practically completed, the Curtiss Aeroplane and Motoe Corporation has launched its eampaign to establish aerial transportation as a thing of the

present.

The Buffalo and Garden City plants are now in operation on peace orders and sales offices have been established at S2 Vanderbit Avenne, New York City, with Mc. J. P. Davies as sales

Albisouph a rouge man, Mr. Davies has had considerable experience in alemanahin and office and a separate considerable experience in alemanahin and office experience in the second of the control of the manager.



J. P. Davies. Sales Managar of the Curtisa Aeroplane & Motor Corporation

J. P., Davies, Salas Manager of the Curtisa Aerosphane & Motor Corporate Airon Control of the Co

sport, if combined use me are use a round responsibility of the party of the party

drich Sales Increase 41 Per Cent in 1918 Akron.-Net sales of the B. F. Goodrich Co. for 1918 amounted to \$123,470,188, an increase of \$36,315,116 over last year. Personal Para

Lieut.-Cob. Benjamin Briscoe, of the Briscoe Motor Co., Jackson, Mich., has returned from Europe, where he was in charge of navy aero-planes, air bases and supply depots.

Samuel E. Ryder, for a number of years in the employ of the Motometer Co., Long Island City, is now affiliated with the Detroit hranch of the company opened recently.

the company opened recently.

Lieut. F. M. Young, formerly in the aviation service, has returned from overseas and is now sales engineer with the Perfex Radiator Co., Racine, Wis.

Capt. A. E. Callanan has been appointed general purchasing agent of the Cleycland Tractor Co. He was formerly in charge of production of de llaviand battle planes at the Dayton-Wrighl Co., Dayton.

W. B. Folwell has been appointed sales man-ager of the Stan Par Axle division of the Stand-ard Parts Co.

and Parts Co.

G. M. Rymarcsick, until recently supervising senior inspector of the magneto section of the llureau of Aircraft Production, is now connected with the Simus Magneto Co., East Orange, N. J., as production engineer.

as production engineer. A. Koswick, formerly with the Wright-Martin Aircraft Corporation at their Long Island plant, has accepted a position as an engineer with Ford, Bacon & Davis, in their vitation and report department, with headquarters in New York City.

R. Chauveau, formerly acronautical mechanical engineer, with the Bureau of Aircraft Production, Washington, has been appointed engineering manager of the Ericsson Manufacturing Company, Buffalo, N. P.

V. W. Dow, who was formerly sales manager for the American Bronze Corporation, has been appointed New England representative of the corporation, with offices at 348 Tremont Building, Boston, Mass.

S. F. Dupree, formerly vice-president and sales manager, Caskey-Dupree Manufacturing Com-pany, Marietta, Obio, has been appointed vice-president of the Automotive Products Company, Detroit, Mich.

Joseph Leopold has resigned his commission as licutenant in the Air Service, U. S. A., and accepted the position of mechanical engineer and sales manager with the Jones Motrola, Inc., New York City. Prior to the warr Mr. Leopold was the chief engineer of the Walker M. Levett Co., New York City.

F. W. Sutton has been appointed chief engineer for the Charles F. Bedaux Company, industrial exquencers, Cleveland, Ohio. He resigned as general superintendent of the Dayton Wright Airjalane Company, Dayton, Ohio, to accept the new position in Cleveland, and prior to that was managed of the Continental Motors Company. orporation.

Corporation.

Fred I. Tone, formerly aeronautical mechanical engineer, research department, Burean of Aircraft Production, stationed at Dayton, Ohio, has accepted a position with the U. S. Ball Bearing Manufacturing Company, Chicago, Ill.

P. G. Van de Velde, who has been associated with the French High Commission in New York City, has returned to France.

J. G. Zimmeeman has been appointed engineer in charge of the isquition development work of the Jefferson Electric Manufacturing Company, Chicago, Ill. He was formerly associated with the technical gublicity department of the Spitidorf Electrical Company, Newark, N. J.

Baseball Team to Use Curtiss Planes Baseball I cam to Use Curtiss Planes
The New York National League Baseball Team
has been invited by the Curtiss Company, according to information in the press, to fly to
Philadelphia on April 23, when they start their
series of games at that city. The invitation was
extended by Mr. J. P. Davies.

Instruction and Pleasure Flights at Long

The Long Island Aviation Co., of Central Park, Long Island, New York, is not only giving thorough courses in Bying but is arranging to take up passengers for flights of reasonable length, giving all the thrills of flying, for a small fee. The field is very conveniently located for



Aero-Mail Speed Record Broken in Washing-ton-New York Flight

Washington - The quickest rip between Washington and New York ever made in a Curtisa J. N. V. mail plane with a 150-berspower motive was made on February 28, when the property was and 6 mioutes flying time. He earried 200 pounds of mail, sterting at 11.55 P. M. The 150 of 150 miles was correct in 1 hour and 150 miles was correct in 1 hour and 150 miles.

Leaving Bustleton Field, Philadelphia, at 1.12 P. M., he arrived at Belmont Park at 1.55 P. M. This 90 miles was covered in 43 minutes. The speed between Washington and Philadelphia was 97½ miles an hour and between Philadelphia aod New York 125½ miles an hour. Leaving Bustleton Field, Philadelphia,

Biplaces to Carry Mail to Ships

Biplanes to Carry Mail to Snips New York, March S.—The Kerr Steamship Co. is to operate a fleet of planes to deliver mail from twenty-four to thirty-six hours after the ships leave port. Mail will be carried in waterpoof sacks and will be dropped on deck by the aviators.

Post Office Wants Navy's Capronis

Washington, D. C.—Otto Praeger, Second Assistant Postmaster General, in charge of the air mail, recently said the New York-Chicago service could be put on a regular schedule if the fifteen three-motored Capronis now being used by the Navy Department in France were obtained

friered incremitured Capronis now being used the Navy Destination in Faces were ob"They are powerful enough to carry a tremenare the navier of the capronism of the capronis

Paria-Lilie Mail Service

The accoplanes engaged in the Paris-Lille mail service which has recently been Instituted asart from Le Bourget acrodrome. It is expected that this latter service will be resumed at an early date. The machines and pilots engaged have been lent to the postal authorities by the military authorities. tary authorities.

Another Giant Aeroplane

Another Glant Aeroplans
It is now permissible to site that Mr. G. W.
Terrant, of Byfleet, Surrey, England, the maoufeatured of the Tumous Tarrant army hasts, is contiertured of the Tumous Tarrant army hasts, is con150 feet and a length of 75 feet. It will be
fitted with six congues, developing in all 3,000
horsepower, and it is expected to show a speed
of 80 to 100 miles an hour for a 550 mile flight.
The machine was originally designed as a bomberror carrier, carrier. rs or cargo.
Should an attempt he made on an Atlantic

crossing, cargo and passenger carrying space will be sacrificed for a provision of extra gaso line taoks of sufficient capacity to give the machine the necessary range of action.

UNITED STATES POST OFFICE AIR MAIL SERVICE

Consolidated Report of Operation and Maintenance

MAY 15, 1918, TO JANUARY 1, 1919

-					To ac			_					SERVICE AND UNIT COST					
Agroplane No.	Gasoline	Greate and	Office Force	Motorcycles, Trucks	Rent. Light. F Power, Teleph and Water	Miscellaneous	Pilota	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	Gallon of Gasoline	Total Time Run	Total Miles Run	Miles Run per Callen of Casoline	Cost per Hour	Cost per Mile
2 3 5 6 1 37944 38262 38274 38275 38276 39362 39363 39363 39365 39367 Tetal	\$599.36 486.82 131.50 458.18 317.58 283.52 15.757 414.25 504.22 507.84 43.95 350.80 \$6.587.63	\$105.71 116.79 41.14 104.91 78.24 81.62 2.71 117.88 215.19 140.32 40.70 181.13 45.52 34.94 2.79 48.83 69.62 20.41 \$1,467.90		\$178.55 128.53 147.21 128.53 115.49 12.40 349.21 349.22 130.68 349.20 345.50 325.50 325.50 344.92 285.66 339.34 344.411.23	157, 60 118, 05 157, 60 157, 61 124, 12 22, 06 212, 26 54, 66 222, 29 150, 65 150, 54 101, 59 182, 65 127, 74 139, 30 \$2,660, 75	335.71 274.45 288.42 335.71 215.96 26.388.10 398.10 398.10 398.10 334.17 334.18 156.96 388.51 243.43 229.57 \$5.093.20	\$961.86 843.96 245.32 823.36 613.80 540.40 48.41 749.03 1,023.36 644.73 322.57 864.90 245.65 312.69 184.86 304.12 511.81 427.95 \$9,667.87	356. 47 892. 47 827. 47 728. 03 129. 99 1.058. 93 1.400. 98 1.259. 60 587. 69 1.609. 16 681. 26 228. 36 657. 30 814,51557	427 66 149, 69 427, 89 516, 08 433, 85 9, 77 2,084, 85 1,610, 81 1,478, 43 279, 44 463, 74 1,593, 45; 56, 58 2,63 242, 90 667, 25 832, 36	\$401.77 401.78 299.81 401.78 401.79 331.67 22.56 565.68 565.68 565.69 163.92 565.77 336.01 388.94 \$7,070.29	\$422.48 422.48 308.99 422.47 437.16 16.66 16.66 16.66 15.26 23 526.23 396.09 255.48 404.73 302.57 325.59 404.73 305.59 404.73	4,364,59 3,980,50 3,300,82 299,70 6,690,94 4,326,80 2,052,94 5,989,34 4,684,41 3,202,13 1,484,50 3,994,04 3,766,58	465 1502 1082 935 62 1351 2558 1660 632	24 00 38 42 3 52 42 16 90 35 46 00	10253 8389 2345 8028 4389 4944 550 6629 12734 7371 3401 10583 1901 3307 329 3920 8098 3919	5.61 5.38 5.04 4.05 5.28 8.88 4.90 4.98 4.44 6.04 5.22 2.45 2.90 2.25 3.69 4.84 3.26	\$53. 27 40,64 73. 44 39. 58 50,53 53. 39. 63. 25 38. 38. 39. 65. 19. 51 19. 51	\$.6624 5292 .9021 5436 .9069 .6676 .5449 1.8093 .5736 .8583 .6036 .5659 .2464 .9682 .4512 .9675 .4932 .9611
Average per Mile	\$.0651	\$.0145	\$.0223	\$ 0436	\$ 0263	\$ 0503	\$ 0956	\$ 1435	\$.1385	\$ 0699	\$.0663							

Planes I to 6, inclusive, are Standard type JR-I, with 150 H. P. Hispano-Suiza motors.

Planes 37944, 36262, 38274, 36275, 38276 and 36278 are Curtiss type JN-4-H, with 150 H. P. Hispano-Suiza motors; and Planes 39262 to 39367, Inclusive, are Curtiss type R.4-LM, with 400 H. P. Liberty motors.

OTTO PRAEGER, Second Assistant Postmaster General.

THE FUTURE OF AERONAUTICS

By G. DOUGLAS WARDROP

THE verdict of the Aeronautic Exposition is that a great volume of business awaits the aeronautic manufactur-ers whose product will satisfy the demands of the critical public interested in sport and commercial aerial

Alike in industrial matters and military operations the time Alike in industrial matters and military operations the time element is the supreme factor, and success or indure is finally element in the supreme factor, and success or indure is finally are irrevocable. In either case there usually arrives a moment, when, however promising the initial stages may have appeared, the issue hangs in the balance; the scales are definitely to one side or the other. The critical moment has now arrived for the aircraft industry, whose future for some decades to come depends upon the decisions which must be taken now. Six months hence it will be too late. Inaction at the present time would be fatal.

Energetic action must be taken promptly; things must not be allowed to drift; a settled policy regarding the future must be laid down. The Air Service is in process of demobilization, and those who are going, or have gone, are amongst its best men. If the investment of time and the knowledge acquired by these men is to be properly capitalized, the industry must show definite reason why those men should maintain and sus-

tain their interest.

The absence of all information regarding the future Government policy towards aerial transport is already causing the industry grave embarrassment. It is acknowledged on all hands that for some years to come the aircraft industry cannot be self-supporting without the assistance of the State, and that some considerable time must elapse before commercial aerial transport can be made to pay. Such support has repeatedly been officially promised, but until now has failed to materialize; and while war contracts are being liquidated wholesale, the ban on civil flying still remains, and the aircraft industry is living from hand to mouth, subsisting on an unsubstantial diet of uncertain hopes.

det of uncertain hopes. If may be thought that time will cure this uncertainty and It may be thought that time will cure this unterest each for in a rapidly progressive science such as aeronautics time once lost can never be wholly regained. Not only is the present highly efficient industry beginning to disintegrate and to turn its activities into other channels, but its highly skilled to turn its activities into other channers, but its highly skilled technical staff, which at present has no equal throughout the world, is rapidly dispersing and becoming absorbed in other industries. And once it has dispersed, it will never come to gether again, but will be finally lost to aeronautical science. So long as the future of the industry renains uncertain, so

long will it fail to attract the best men who can find a more profitable and a securer career elsewhere.

Congress Being Out of Session, Government Action Delayed

The great problems of aerial transportation have but lightly been touched, but they have been touched sufficiently to dem-onstrate their immense possibilities to mankind and civiliza-

Nothing is more important at this time than to stabilize the aeronantic industry, and it is necessary to do so quickly, before aeronautic talent and trained aviators and skilled labor look

elsewhere for positions.

The Government should be the main factor in stabilizing the aeronautic industry, at least for the next six months, while the plans for the employment of aircraft for special purposes are put into effect. Unfortunately, Congress is out of session, and there seems to be no prospect for an extra session to be called on time to insure Government action on the aircraft situation in time to benefit the aeronautic industry this year.

Atlantic City Convention and Races Aeronautic Industry's Best Asset

The one month Aeronautic Convention, Exposition and Races to be held at Atlantic City from May I to June I, inclusive, are the aeronantic industry's best assets.

With the convention there will be held aeroplane, seaplane

and dirigible races and other demonstrations, together with an extensive Aeronautic Exhibition.

The Convention and Races are to be held under the auspices

of the Aero Club of America, the Aerial League of America and the Pan-American Aeronautic Federation. The Governments of all the Allied and Latin-American comutries and their aeronautic, sporting, seisntific, industrial and educational organizations are invited to send commissions to the covention.

The races to be held each Saturday will include:

(1) Seaplane Contests (general)
 (2) Curtiss Marine Flying Trophy and Prizes
 (3) Intercollegiate Seaplane Contests

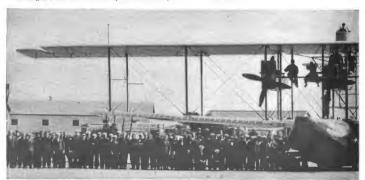
(4) Land Aeroplane Contests

(5) Dirigible Contests

(6) Kite Balloon Speed in Ascending and Descending and Maneuvering Contests

(7) Parachute Competition.

(8) Aviette (bicycles and motorcycles with wings) Contests.



The three Liberty-Metored Flying Boat N. C1, constructed by the Curtiss Engineering Corporation, which accommodated

The Daily Program for the thirty days will comprise: Exhibits of aeroplanes, motors and accessories on the Steel Pier.

- (2) Demonstrations and tests of seaplanes, land aeroplanes, motors, dirigibles, kite balloons to prospective customers
- (3) Aerial passenger carrying by seaplanes and dirig-
- ibles and kite balloon ascensions.

 (4) Moving pictures and addresses on most important phases of aeronautics.

The convention aims, for the first time in the history of aeronautics to permit thorough discussion of each of the important phases of aeronautics, so that people interested in each phase may acquire all the information available on the subject. The program is most thorough and complete. Tens of

The program is most infrough and complexe, areas of thousands of people of different lines of endeavor related to aeronautics are invited to attend. For instance, on the fifth day, when "The Large Dirigible and Its Value for Trans-portation" is discussed, there are invited the representatives of railroads, express, steamship and other transportation organizations to attend.

For the illustrated addresses on "Aerial Forest Patrol" the Forestry Department of every State are invited to attend. For the discussion of the "Work of Aerial Police Squadrons, and Why Every City Should Have One," the police commissioners are all invited.

For the illustrated address on, and consideration of, "Aerial Mail Plans," the Chairman of Post Office and Post Roads Committees of House of Representatives and Senate and Postmaster General Burleson and 26,000 United States Postmasters and Chambers of Commerce of 13,000 cities are invited to attend.

Likewise for the illustrated addresses on the "Need of Likewise for the illustrated addresses on the Aced of Municipal Aerodromes and the Part to Be Played by Aircraft in City Planning," the Chambers of Commerce and City Planning Commissions are invited to attend.

For the Presentation of the Flags by each State of the

United States to the Aero Squadrons representing the States, all the States and Cities are invited to send delegates, and the

all the States and Clies are invited to send detegates, and use Army, Navy and Marine Corps to send representatives, on the For the Demonstrations and Illustrated Address, on the material advertisers and advertising agents are invited to attend. For the discussion of "Pan-American Aerial Trans-port," the commissions of the twentyLatin-American Repub-port," the commissions of the twentyLatin-American Repub-

port, the commissions of the twenty anti-American respan-lies are invited to attend. For the addresses on 'Aerial Photography," all the pho-tographers, professional and amateur, and makers of photo-graphic apparatus are invited to attend.

graphic apparatus are invited to attend.

For the discussion of "Aerial Navigation Instruments for Flying Over Land and Water," aviators, navigators, scientific instrument makers and aeronantic experts are invited to attend.

For the addresses on "Aerial Exploration and the Use of

Aircraft for Coast and Geodetic Survey," all people inter-

Aircraft for Coast and Geodetic Survey, all people inter-serted in exploration and surveying are invited to attend, and administration of the property of the control of the companies and agents are invited to attend. For the addresses on "Aerial Jurisprudence—Aerial Laws and Regulation of Air Traffic," all lawyers, traffic commis-sion of the companies of the commission of the commissio

sioners and police authorities of different countries are invited

to attend, For the Aeronautic Art Day, when an address on "Aerial Painting and Sculpture of Different Countries" will be deliv-ered and exhibition of aerial paintings by Lieut. Farre and

Lieut. Rutan and others, all the prominent artists, managers of art galleries and art patrons are invited to attend. The engineers are invited to attend engineering week, when basis problems of aeronautic engineering are to be considerd.

usais prottems of aeronautic engineering are to be considered. For the discussions of "Meteorology—How the Weather Forecasts Can Be Extended and Made More Efficient by the Use of Aircraft in Exploring the Upper Air," also "How the Weather Forecasts Help Aerial Navigation" and "Telegraphic and Climatic Factors in Relation to Aeronautics,"

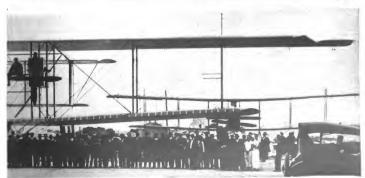
graphic and Cimatic Factors in Retainsh to Aeronautics, people interested in the subjects are invited to attend. For the discussion of "International Medical Standards for Aviators in War and Peace," when reports from different countries will be presented by the highest authorities on the subject, 50,000 medical men are invited to attend.

The Aerial Mail Service

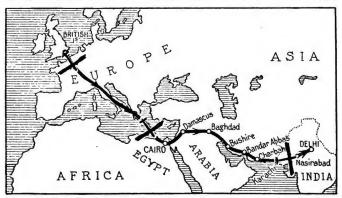
The Aerial Mail Service was inaugurated May 15, 1918, and during the first six months of its existence this operations covered 68,892 miles, at a cost of \$75,165,94, including 6 per cent on investment and 33 1/3 per cent for depreciation. In that period it carried between Washington and New York in that period it carried between Washington and New York 7425/2 pointed so of aeroplane mail. The revenue derived was \$0.053.28. The net defect, not taking into account the 6 per cent interest on investment, was \$859.08. In addition to the aeroplane mail carried there was dispatched between Washington, Philadelphia and New York in the six month's period a total of 91,926/2 pounds of first-class mail, aggre-gating 3.667.00 letters. This mail was advanced in dispatch gating 3,667,040 letters. This mail was advanced in dispatch from 6 to 12 hours, which many times made up for the small deficit in the operation of this service. This ordinary mail was letter mail from distant States, which was carried in addition to the aeroplane mail. Thus the ordinary mail put on the planes at Washington was usually mail from the South Atlantic Coast States and the Gulf States, distributed to carriers by the Railway Mail Service before reaching Washing-ton, and by reason of aeroplane dispatch was delivered in New York on the same afternoon instead of the following

New York on the safety arterioron treasure of the homomorning.

The Washington-New York route was established not as a typical commercial line, but to solve the problems that had to be met to establish a daily dependable schedule. The flying



fifty passengers on a test flight, and which promises to be one of the first contestants for the trans-Atlantic flight



The remarkable flight of Major-General W. G. H. Saimond, Captain Roas Smith, British Air Force, and two mechanics, from Cairo, Africa, Delhi, India, a distance of over 3,000 miles

record made on the New York-Washington line has never been equaled in the history of aviation, and its operation by civilian flyers of the Post Office Department has far exceeded its operation while under military control, the civilian fliers having a record of but 7 forced landings in 100 consecutive having a record of but 7 forced landings in 100 consecutive flights and only 2 failures in that time on account of fog or storm conditions. The mail has been carried in blinding rain of the conditions of the condition of the condition of the state of the condition of the condition of the condition of the strength of the condition of the prompts according to the condition of the condition of the property of the condition of the condition of the condition of the property of the condition of the condition of the condition of the property of the condition of the condition of the condition of the property of the condition of the condition of the condition of the property of the condition of the cond

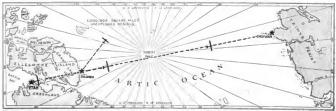
of aeroplane mail is that a letter posted in the down-town sta-tion in Washington as late as 10.50 a. m., and leaving the aviation field at 11.30 a. m., is usually delivered between 4

and 4.30 in the afternoon, which is in ample time before close of business.

The greater the distance between the points on an aerial The greater the distance between the points on an aeral mail route the preater is the service rendered to commerce and the greater is the patronage of the line. A mail service leaving New York at 6 in the morning and arriving in Chicago before 3 o'clock in the afternoon, in time to connect with carrier deliveries, will advance the mail between the two cities by 16 hours over any train dispatch that can be made after the departure of the Twentieth Century Limited from New York at 2.45 p. m. The department desires to establish this line immediately and extend it west to the foot of the Rockies line immediately and extend it west to the foot of the Rockies during the coming fiscal year, with the view of reaching the during the coming fiscal year, with the view of reaching the the appropriation necessary. The air mail time between New York and San Francisco will be less than 40 hours. It is desired that this transcontinental trunk line shall be tapped by lines from Minneagolis, Se. Paul. Sci. Louis, Kamasa Cipi. Allany, Buffalo and Detroit, to Chicago. A north and south trunk line from Boston to Atlanta should



The Kite Balloon was an effective observation unit in the Great War-it can be made an



The diagram of the proposed flight to the North Pole, which Capt. Robert A. Bartlett will undertake this summer Aero Club of America under the auspices

likewise be established with an ultimate extension from Boston to Montreal, Canada, and from Atlanta, via Key West, to ton to Molifeta, Lanada, and from Atlanta, via Acy vrest, or Havana. Based on the accurate cost accounting kept in the operation of the Washington-New York air mail line, the cost of an east and west trunk line from New York as far as Omaha and a north and south trunk line from Boston to Atlanta has been carefully estimated at \$1,600,000. To this to Atlanta has been carefully estimated at \$1,600,000. To this should be added \$400,000 for several essential feeders that should be added \$400,000 for several essential feeders that would connect up Detroit, Minneapolis, St. Paul, St. Louis, Kansas City and other points, and would admit of an extension as far west as Salt Lake City, this extension, however, dependent upon the extent to which the Government equipment can be transformed into strong and safe mail-carrying machines

Aerial Program of Foreign Countries

Italy: (1) Civitavecchia-Terranova, Sardinia (150 miles). Italy: (1) Civitavecchia-Terranova, Sardinia (150 miles). Daily mail service by means of flying boats. Inaugurated June 27, 1917; temporarily discontinued during the winter of 1917-18; reopened in March, 1918. Average time, 2 hours. (2) Venice-Trieste (170 miles). (3) Venice-Pola (80 miles). (4) Ancona-Friume (130 miles). (5) Ancona-Zara (90 miles). (6) Brindisi-Cattaro (150 miles). (7) Brindisi-Valeona (100 miles).

Organized shortly after the signing of the armistice with Austria; operating: (8) Genoa-Nice (100 miles). (9) Genoa-Florence (120 miles). (10) Florence-Rome (140 miles). (11)

Rome-Brindisi (290 miles).

Air mail lines (8) to (11), now being worked out, will con-stitute the Italian section of an interallied air mail service to be established between London, Paris, Rome and Constan-

France: (1) Paris-Mans-St. Nazaire (250 miles). Daily mail service by means of twin-engined Letord biplanes (Hispano-Suiza engines). lnaugurated August 15, 1918. Average time, 3 hours. Postage 75 centimes (15 cents). (2) Paris-

London (240 miles). (3) Paris-Lyons (240 miles). (4) Lyons-Marseilles (165 miles). (5) Marseilles-Nice (140 miles).

Air mail lines (3) to (5), now being organized, will const that the French section of an interallied air mail service to be established between London, Paris, Rome and Constantinpole.

(6) Nice-Ajaccio, Corsica (150 miles). Daily air mail service by means of flying boats about to begin operations.

service by means of nying boats about to begin operations. Various air mail lines, operated by the military, are functing official correspondence. The organization of an air mail line from Marseilles via Algiers to Timbuctoo is now being worked out. The sections, Biskra-Wargia (240 miles), and Wargua-Inticl (211 miles) and Intiel-1 in Salah (223 miles), are in operation.

Great Britain: (1) London-Paris (240 miles). Daily pas-Great Britain: (1) London-Paris (240 miles). Daily pas-senger service, weather permitting, by means of twin-engined Dit-I oblaines. Now being jointly organized by the Aircraft of Ditable of the Company of the Company of the Company Generale Transcrience, of Paris. Average time, two and one-half to three hours, 1918. (20) miles). Daily mail ser-order of the Company of the Company of the Company of the Miles). Daily mail service projected. Demark: (1) Copenhagen-Codense-Frederica-Essier (270 miles). (2) Copenhagen-Kaljundborg-Aarlus (105 miles). (3) Copenhagen-Cohenburg-Christiania (330 miles). Daily mail

service projected.

Austria: (1) Vienna-Budapest (140 miles). Daily mail service, inaugurated July 5, 1918. Postage, 5.10 kronen (\$1). Norway: (1) Christiania-Stavanger-Bergen-Trondhjem (670 miles). Oversea route. (2) Christiania-Bergen (200 miles). Overland route. (3) Stavanger-Bergen (100 miles). Oversea route.

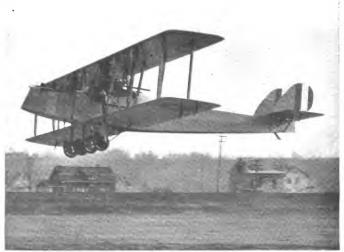
Projected air mail lines to be operated by the Norvegian Air Routes Co.: (4) Stavanger-Aberdeen, Scotland (320



qually effective adjunct of the Meleorological office in connection with weather lorecasting



The Twin-Liberty-Metered American Handiny-Page which could be utilized effectively for Aera Mail on such trips as the New York-Chicago ren



The Glenn L. Martin twin motored biplane, the manufacturers of which are now offering to construct similar machines for pleasure and com-

33

miles). Projected air mail line to be jointly operated by the Norvegian Air Routes Co. and Aircraft Transport & Travel (Ltd.), London.

Spain: (1) Madrid-Barcelona (320 miles). Barcelona-Palma Balears (170 miles). Projected air mail lines to be operated by a Spanish company,

Future of American Aerial Mail

A comprehensive plan for the development of the U. S. Aerial Mail Service has been adopted by Postmaster General Burleson.

This program directs, first, the establishment of an aerial mail service, connecting the principal commercial centers of the country by a system of trunk lines and feeders, and, sec-ondly, connecting this country with the West Indies and Central and South America. The trunk lines and feeders decided

tral and South America. The trunk lines and feeders on under this program are:

1. New York to San Francisco, with feeders from—

a Cheago to St. Louis and Kansas City,

c Cleveland to Pittsburgh.

C Cleveland to Pittsburgh.

Boston to Key West, with feeders from—

a Philadelphia to Pittsburgh,

b Washington to Cincinnati,

Washington to Cincinnati, Atlanta to New Orleans.

Key West via Havana, to Panama. Key West, via the West Indies, to South America. On this program Postmaster Burleson reports progress as

follows (1) Boston to Key West-Of this route the Washington-New York division has been operated since May 15th and is

functioning perfectly.

The Boston-New York division has been tentatively laid out and will be established as soon as sufficient funds and planes

are made available. The Washington-Atlanta and Atlanta-Key West routes are now being worked out with a view to their early establish-

ment. (2) New York to San Francisco—Of this route the di-vision from New York to Chicago has been carefully worked out. The War Department, under act of Congress of July 2, 1918, has released to the Post Office Department, for the use of this division, aeroplanes of 650 pounds mail carrying capacity, which are no longer suitable for war needs. The hangars have been ordered, landing fields obtained, and the route has been ordered established before the close of the present year. In a series of aeroplane flights by the Post Office Department, early in September, the route was carefully charted for emergency and regular landing fields. In this work one aeroplane made a record flight from Chicago to work one aeropiane made a record night from Chicago to New York in less than fourteen hours, including all stops en route. The flights were made through storms and heavy rains over parts of the route. The reconnaissance developed that it will be feasible to maintain a nine-hour schedule

between New York and Chicago, as compared with the twentyone-hour schedule of the Twentieth Century Limited. The New York-Chicago schedule for the present will call for de-New York-Chicago schedule for the present will call for de-parting from New York at 6 a.m., and arriving at Chicago about 3 p.m., thus connecting with all city deliveries. The Chicago and Cleveland will be can to 3 hours 45 minutes, and between New York and Cleveland to 5 hours 15 minutes. Mail from the Adlantic Seaboard will be advanced from 12 to 24 hours to the West and Southwest by this new service. The feeder routes from Chicago to St. Louis, Kansas City. The reeder routes from Chicago to St. Louis, Kansas City, St. Paul, Minneapolis, and the remainder of the trunk line from Chicago to San Francisco will be worked out during the ensuing year, with a view to their early inauguration.

(3) Key West to Panama, and

(4) Key West to West Indies and South America—

Negotiations looking to the conclusion of special aerial mail conventions between the United States and the foreign countries involved for the establishment of these routes to the West Indies and Central and South America are now in progress. It is realized that these oversea routes will require the most powerful aeroplanes with wireless installation and

special construction to make them safe over the seas, but the enormous commercial advantage that will result by materially reducing the time between this country and Central and South America will justify the expenditure that such a service will entail. It is a stupendous plan, which opens the great airways of South and Central America and Canada—the maps and de-tails of which have been worked out and are to be published

in Flying in the near future. This is the dawn of the Aerial Age, when those of us who

have assisted the development of aeronautics for-well, a lifetime-will see things happen such as we never dared to hope.

Aerial Transportation Lines Planned the World Over

Aerial transportation lines were planned while the war was still on, and the plans began to be put into effect soon after the signing of the armistice. Thousands of aerial transportation lines are being planned,

Thousands of aerial transportation lines are being planned, a few of which are quoted herewith:

(1) From London to Salonica, by way of Nice, Rome, Brindisi and Vallona.

(2) From England to the United States, proposed by Lord

Morris, who has championed the project in Parliament.

(3) From Spain to the United States, proposed by Captain (3) From Spain to the United States, proposed by Captain Herrera, chief of the Spainh Air Force, which has been dis-approval of King Alfonso of Spain.
(4) From the United States to England, proposed for next June by Captain Benjamin B. Lipsuer and a group of other very public-spirited men, who are planning to establish a num-

ber of aerial transportation lines in the United States,

(5) Between Australia and London, proposed at a meeting



arying out interactioned serial love the "earlal pelice," international or octions, will, no doubt, here to use "seredrouse thine," which will be a serial pelice, but the serial pelice, in the serial pelice, in the serial pelice, in the serial pelice, in the serial pelice, as the serial pelice as the serial pelicens of the serial pelicens will reduce the serial pelicenses will reduce the service serial pelicenses will reduce the service serial pelicenses will reduce the service between the pelicenses of serial pelicenses will reduce the service pelicenses of serial pelicenses will reduce the service the service serial pelicenses to service the service to a service serial pelicenses the service of the service service services and service service services are serviced to the service services and services are serviced to the service services and services are serviced to service the services and services are serviced to service the services are serviced to the service services and services are serviced to the service services and services are serviced to the services are services and services are serviced to service the services are services are serviced to service services are serviced to service services are services are serviced to service the services are services are serviced to service services are services are serviced to service services are services are services are serviced to service services are services are serviced to service services are services are



First Arrial Fire Fighters during the hope histe which wiped out many of the new harrache at Camp Mills, Long islanshoot noon December 11, 1918, Lout, Carroll and Livet. Whath frew their siness through the thick closes of rolling amond the state of the best, both pilots kept within two hundred feet of the configuration and found very little difficulty in overcoming the in means "hungs" which tended to threw the ship coul of control. As the finance were getten under control, Licet. Carroll



The "feliatives Fury" the Parts trypins flying best. This moster flying best, the largest in existence, is a flexible machine with British angline. It is fitted with the RelikinGraye "Region" engines correspond in tendem sets and one single, "poulted" propoler's prepilers in the tondem sets are four-bladed, and the others two-bladed. The total span of the wings is 123 feet; the length of the busings, 60 ft; the height from keel to ring propoler. The relicion of the relicion

35

of business men at Sydney on October 2. The aerial service would take only 150 hours for the trip.

(6) From London to everywhere, proposed and being car-

ried out by Holt Thomas, the managing director of the British Aircraft Manufacturing Company, who explains his plans as follows: "We are opening air routes all over the world in conjunction with local companies. In France we will operate

conjunction with local companies. In France we will operate in connection with a French company, and afready arrangement, which was a first company, and afready arrangement, Italy, India and Africa. Later we will extend the service to Japan, China and the West Indies.

(7) From India to other parts of the British Empire, profile of the Company of th

(10) From London to Britotis, by way of Paris, Lyon Marseilles, Turin, Florence, Rome. From Algiers to Biskra, Ouargia, Bourassa, Timbuctoo, Koulikoro and Dakar. (12) The British Civil Aerial Committee, like the United States Post Office and the Aero Club of America and the Aerial League of America, has plauned art lines to every direction of the compass, by aeroplane and dirigible. A report made public on December 13 says, in part: "Airships now exist," the report says, "with a range of more than 4,000 miles, and they can travel at a speed of seventy-eight miles an hour By running their engines slower a maximum range of 8,000 miles can be obtained.

"On first speed Cape Town, South Africa, is today aerially only a little more than three days from Southampton, while this ship could fly across the Atlantic and return without

stopping.
"The committee points out that the future airship will soon develop a speed of 100 miles an hour, that it will be fitted with ample saloons, staterooms, with an elevator to a roof garden,

ample saloons, staterooms, with an elevator to a root gaucin, and will be able to remain in the air for over a week."

Mr. Edward M. Thierry, the Berlin staff correspondent of the N. E. A., has reported that Germany is building superthe N. E. A., has reported that Germany is building super-Zeppelins for trans-Adatute flight. His report follows: "I have visited the immense works outside Berlin at Staaken. Zeppelin works at Friedrichshaven a secret hitherto unre-vealed—that on a record distance flight in November, 1917, a Zeppelin flew from Jamboli in Bulgaria to Khartoum in Egypt and return, a distance of 1,000 miles in 96 hours. "On this flight the Zeppelin carried, a crew of 22 men and

25 tons of munitions and medicine intended for the relief

of General Lettow-Vorbeck, in German East Africa. The Zeppelin received a wireless from Berlin when it was above Khartoum, ordering its return because of a rumor without landing.

"This machine had a gas space of 67,000 cubic meters (87,-634 cubic yards).

"The new super-Zeppelin, which is now building, has a gas capacity of 100,000 cubic meters.

It will have nine engines and eight propellers.

Trans-Atlantic Zepoclin Is 800 Feet in Length

"It will be more than 800 feet in length

"This super-Zeppelin will cost nearly \$1,000,000.
"It will have a carrying capacity of 100 passengers and 45 tons of mail and baggage and 30 tons of petrol, oil and water and provisions,

The first machine for the trans-Atlantic service is to be completed in July. For maintenance of the service planned, eight active machines and four in reserve will be required. "As soon as the international situation is clarified, it proposed to establish the service with a hangar in New York.

Roosevelt Arctic Expedition

The Executive Committee of the Aero Club of America have decided to make Captain Barletts' Arctic Expedition the "Roosevelt Memorial Expedition."

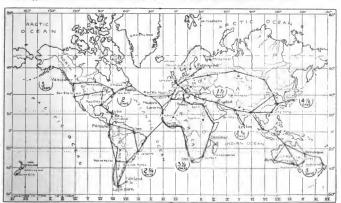
It was Roosevelt, while he was President of the United States, who gave Admiral Peary leave of absence to organize and take charge of the expedition, which led to the discovery of the North Pole. It will be recalled that Peary's ship was the control of the North Pole. It will be recalled that Peary's ship was control to the North Pole. It will be action of President Roosevelt's united to the Pole Pear's the Pole Pear's the Pear's the North Pole Pear's the Pear's the North Pear's the North Pear's the North Pear's the North Pear's the Pear's the North Pear's the North Pear's the Pear's

of the Roosevelt in two Peary expeditions. Colonel Roosevelt was a veteran supporter of aeronautics. As early as 1897, when he was Assistant Secretary of the Navy, he used his influence to secure the appropriations needed

by Professor Langley to continue his work.
Colonel Roosevelt was also responsible for giving the U. S.
Army an aeroplane before any other nation had one. In 1907
he approved the ordering of a Wright biplane and a dirigible. The Roosevelt Memorial Expedition will have four important missions, as follows:

To explore as much as possible of the 1,000,000 miles unexplored Polar Arctic regions.

(2) To fly across the top of the world from Cape Columbia on the American side to Cape Chelyuskin on the Siberian side.
(3) To conduct extensive soundings in the Polar Basin and collect flora and fauna from the ocean bottom.



The World's air routes as outlined by Mr. Holt Thomas, the British aeranautic authority

(4) To send up sounding balloons and explore the upper air of the Polar regions, gathering meteorological data. It is also fitting that the first land, if any land is discovered

in this first use of aeroplanes for Arctic exploration, shall be named "Roosevelt Land."

The expedition is to start from the United States next June. There are six weeks of fair weather to July and August when, even in the Polar regions, it is seldom lower than sixty degrees above zero. The plans are to have a shi go to Etah, about 600 miles from the North Pole, in June, when the ice is sufficiently broken to permit the ship to cross Mellville Bay.

The ship would carry a large seaplane or land aeroplane for the final flight across the top of the earth, and for long distance exploration of the unexplored Polar regions, as well as smaller planes for the scouting flights for short distance

Immediately upon arrival at Etah a base will be established, immediately upon arrival at Etah a base will be established, and while waiting for the ice to break up further north to permit the ship to go as far as Cape Columbia, the small seaplanes will by to Cape Columbia and establish a base there for the large plane which is to be used for the flight across the top of the world, from Cape Columbia on the American side, over the Pole, to Cape Chelyuskin on the Sherian side and for extraordion once forms. and for exploration over longer distances.

For the six weeks after the middle of July, when the weather conditions are best for flying in the Polar regions, the large plane as well as the small planes will be put into service, and the important work of the expedition will be done, including sending up sounding balloons in the upper air to gather meteorological data.

Results of inestimable value to the United States and to science will surely be obtained from this expedition. There is no doubt whatever that this expedition can explore, survey and photograph the unexplored parts of the Arctic regions and establish the existence or non-existence of land or lands

in that region.

ane Committee of the Aero Club of America assisting Captain Bartlett cousists of Rear Admiral Robert E. Peary, discoverer of the Porth Pole; Alan R. Hawley, Henry A. Wiis Wood, Henry Woodhouse, Rear Admiral Bradley A. Fiske, John Hays Hammond, Ir., Rear Admiral William E. Little, U.S.N.; Professor Charles L. Poore, Colonel E. Lester Jones, U.S.A.; Charles Jerome Edwards, Major Cushman A. Rec, U.S.A.; Augustus Post, Jaljor J. C. McCom. The Committee of the Aero Club of America assisting

British Polar Aerial Expedition

Plans have been quietly laid for a British aeroplane expedition to start for the North Pole in April. The British party will travel via Spitzenbergen, where, under the direction of Captain Wild, who was second in command of Sir Ernest Shackleton's South Polar venture, a landing place is in the course of construction at Lawe Sound, and where a camp with abundant supplies has been established.

Captain Frank Wild is a veteran in Antarctic exploration. He was second in command of the Scott expedition in 1901-4 and was a member of the Dr. Douglass Mawson explorate young party some years later. He was with Sir Ernest Shackleton first in 1907-5.

Captain Wild commanded the twenty-two men who were left on Elephant Island April 16, 1916, by Shackleton, when he made his famous journey of 750 miles in an open boat with six comrades to South Georgia Island for relief. Wild and his men lived until August 20 on one meal a day, consisting mainly of penguin fried in blubber, unaware that Shackleton had been successful and that help was on the way. They endured incredible hardships.

Aero Club of America Organized Aerial Transportation Committee

Soou after the signing of the armistice the Aero Club of America organized an Aerial Transportation Committee of important members of the Club to develop plans for the drafting of regulations to govern aerial navigation.

Rear-Admiral Robert E. Peary has been selected as Chair-man of this important "Aerial Transportation Committee", of which the following prominent members of the Club have

been nominated to be members:

been nominated to be members:

Col. Bion J. Arnold, Roger W. Babson, Sir F. W. Baillie,
Major T. F. Baldwin, U. S. A.; Bernard M. Baruch, Capt.
R. A. Barlett, Alexander Graham Bell, Major August Belmont, U. S. A.; Laurence V. Benet, Walter Berry, Lieut.
Commander P. N. L. Bellinger, U. S. N.; Lauc, Commander W.
Starling Burgess, U. S. N.; James M. Beck, General Theodore A. Bingham, Lieut. Col. James A. Blah; Jr.; William H.

"One of the purposes of the Aerial Transportation Com-mittee," said Mr. Hawley, "will be to advise the representa-tives of scores of cittles in the United States who are con-stantly applying to the Aero Club of America and the Aerial League of America for information, advice and guidance in

establishing aerodromes.

"Another purpose will be to cooperate with the Post Office in establishing aerial mail lines and extending the aerial mail service.

"Preliminary reports on the subject of aerial transportation and regulations to govern aerial navigation have been made to the Board of Governors of the club and data has been collected showing what England, France and Italy are been collected showing what England, France and Italy are planning to do. These countries are planning most extensive air lines, although their geographic conditions are not as favorable for aerial transportation as they are in the United States. We should do likewise in this country and utilize the 20,000 Liherty motors which are being stored utilize the 20,000 Liherty motors which are being stored which will be entirely wasted unless used during the coming six months as aeronautic equipment deteriorates fast. six months, as aeronautic equipment deteriorates fast.

Recommendation for the Solution of National Aeronautic Problems

In an address before the Convention of the National Rivers and Harbors Congress, President Hawley of the Acro Club of America, offered the following recommendations:

- (1) The organization of a Government organization simliar to the Grain Corporation, to be known as the Aerial Transportation Corporation, or a similar name, capitalized at \$50,000,000, which shall take over the \$800,000,000 worth of S-90,00,000, which shall take over the S80,00,000 worth of aeroplanes, mutors and aeronautic equipment which the Army corporation shall devise ways and means for salvaging this equipment, utilizing whatever can be used to establish aerial transportation lines in the United States and supplying the South and Central American countries which are auxious to have aerial transportation lines.
- (2) Let this Government owned Aerial Transport Company take over the twenty or so Army aviation stations and aviatio depots which the Army has abandoned or is abandoning and operate them as public aerodromes where the Post Office as well as civilian aviators can use the hangars and facilities by paying rent.
- (3) Let this corporation establish and operate aerial trans-(3) Let this corporation estaints aim operate aerial trans-port lines between industrial centers. Some of these lines can run from New York to San Francisco, from Washington to Chicago, from Minneapolis to New Orleans, from New Orleans to New York, from Seattle and Portland, Oregon, to San Francisco, Los Angeles and San Domingo, from De-troit to St. Paul, from Key West to Havana, from Portland, Maine, to Boston and New York. Scores of such aerial



The aerial limousine of the Dayton-Wright Company, making a week-end journey of 1.500 miles an event of juxury

transportation lines could be established and operated immediately, employing some of the thousands of tile. Army and call the could be called the called the could be called the calle

(5) The Department of Commerce should be given charge of the registration and inspection of aircraft, creating in the Department of Commerce an Aircraft Inspection service similar to the present Steamboat Inspection Service.

"The subject is most extensive and it is therefore impossible to discuss in detail the regulations that have been proposed by the British Aerial Transport Committee. Mr. Henry Woodhouse has made a close study of the aerial regulations of different countries in the past ten years, and has pointed out by actual illustrations how some of the most difficult problems of enforcing the aerial regulations can be solved by using the wireless telephones developed by Colonel. C. C. Culver."

Foodstuffs by Aeroplane

The British Air Ministry have sanctioned the scheme to carry foodstuffs to Belgium by aeroplane. This is satisfactory news and marks the inception of the commercial traffic from

this country, although those who are endeavoring to read the signs in the skies have noted with interest that a sipulation has been made by the authorities. In giving their approval to the scheme the Ministry have insisted, as in the case of the Paris Airbus, that service-pilots of the Royal Air Force, and rather tends to a trengthen the belief that the Air Ministry means, if possible, to retain the control of commercial aviation, although it may be that on the signing of Peace the ban will be litted. We must wait and see. So far as the scheme it, as they find it impossible to ship the foodstuffs they have purchased in England for their people, owing to the congestion at all the docks in England. The flights are to take place from Hawking's Aerofrome to the Belgium Aerofrome outerons of foodstuffs.

Popular Priced Trips in England

General Sir David Henderson, of the Royal Air Force, proposes before demobilization to organize flights of six or rejutaerplanes around the principal cities and towns in Great Britain. The object of these visits would be to provide flights for the general public at a low fee, approximately three dollars of the proposition of the propo



The Aeromarine Model 40 T Flying Boat is pravided with a 100 horse-power Curtiss OX engine. This machine has been designed to anaway requirements of the sportsman,



The Curtiss twin-metered Flying Boat, which will become popular with sportamen with homes on the waterfront, occommodating, as it does, a dozen passengers

Flying-Boat Popularity

No small share of the coming developments lies with the flying-boat, which has been improved considerably since it was introduced to active service on behalf of the Allies The sloppy machines of those days and the comfortable enclosed type which is now in view at the Aeronautic Exposition for civilian use present a great contrast, with all the advantage of experience and serviceability on the side of the later produc-tion. Some of the designs which have come under our notice recently combine boat excellence with biplane merits, every detail proving that the lessons enforced in the stern tests of warfare have been properly applied in planning the new craft. It would be idle to say that the flying-boat has fully qualified itself yet for the open sea, where rough water and rough weather have to be taken into account, but it is a progressible proposition and will go ahead in more senses than one,

Commercial Aeronautic Possibilities in South Africa

A London aeronautic publication has discussed the future of commercial aeronautics in South Africa in a recent issue which

commercial aeronauties in South Africa in a recent issue which indicates the progressive attitude of the British industry. Realizing that for the present the most important function that aeronautic transport can aecomplish is the delivery of mails and passengers, in this respect, conditions in South Africa are especially conductive to aerial commerce. The populations of the properties of the progression of the progression of the properties of the progression of the Affica are especially conductive to arrial commerce. The population is small, but wealthy and active. Distance between cities is large and railroad communication poor. The railways follow the contour of the hills, having been built at so much per mile. The contractors therefore avoided bridges, tunnels

and embankments. Grades of one in forty are numerous. The windings and contortions of the snake-like tracks make In windings and contortions of the shake-linke tracks make it seem quite possible in many places to shake hands with the engineer in the rear car. The ever-present sand and dust are sepecially disagreeable. These conditions, as compared with cool and speedy transportation by aeroplane, would make it difficult for railroads to compete with well-organized aerial passenger lines.

The stable weather conditions, absence of hurricanes and high winds, extreme clearness of the atmosphere, the definite rainy season on only one short fixed period of the year make

rainy season on only one short fixed period of the year make conditions excellent for reliable air travel. If precious metals are a fixed to the control of the control of the control of the well as its ability to supply many of the necessary materials for the maintenance of commercial aircraft, makes the pros-pects of an enterprising aircraft organization most excellent. Alcohol suitable for fuel is produced in considerable quantities and the climate in some parts is suitable for spruce growing Land is available for aerodromes at low rates.

The details of various routes are outlined in the article. The first route is suggested from Cape Town to Kimberly, 525 miles air line. The train service between these important points consists of two trains each way daily, with a running time of thirty hours. The estimated time by air, allowing for stops, is eight hours.

A route from Kimberly to Johannesburg, requiring 45 hours by rail, could be covered by aeroplane in twelve hours. From Kimberly to Durban a saving of thirty-six hours could be made, the time by rail being forty-one hours and by plane five and a half hours.



The Doyton-Wright De Haviland 4, converted from a bombing machine into an enclosed passenger craft for two passengers and pilot

The ultimate expansion of an aerial transport system would result in a route from Cape Town to Cairo.

Australia Has Commercial Aeronautic Plans

Auckland, New Zealand,—The Minister of Posts and Telegraphs in New Zealand is supporting a movement for the establishment of aerial transport and aerial mail lines between various parts of New Zealand, extending from Auckand to Dunedin, a distance of 700 miles, and between New Zealand and Australia

Mr. L. A. Walsh, the managing director of Walsh Brothers & Dexter, Ltd., aeronautical constructors and engineers, who was in charge of the training of military aviators during the war, has been one of the moving spirits in the development of these plans. Under his direction several types of single and twin-motored flying boats have been constructed, employing Hall-Scott motors for propulsion.

A large number of military fliers will be available for operating commercial aircraft.

A 3,000 H.P. British Machine

The latest British commercial aeroplane is the Tarrant triplane, a huge machine with a wing span of 159 feet and a length of 75 feet, being built by Mr. G. W. Tarrant, of Byfleet, Surrey. It will, when completed, have a six-engine power plant developing 3,000 H/P., and it is expected to travel at 80 to 100 miles an hour for 500 miles without refuelling. The machine, which is a development of a "bomber" about to be produced when the armistice was signed, is designed to accommodate passengers or cargo.

People seated in the body of the machine will be in an enclosed etabin provided with windows. As a cargo plane the machine will carry nearly six tons of goods. The whole of the interior of the body space will be available for the cargo or for passengers. By the sacrifice of cargo space and the substitution of petrol lanks, the range of the triplane could be greatly increased, a trip across the Atlantic being made a comparatively simple task.

Marconi Company to Supply Wireless Passenger and Mail Aeroplanes

Godfrey Isaacs announced December 18 that the Marconi Company would outfit aeroplanes employed in air passenger and mail service with wireless and would supply operators in the same way as it now serves ships. It also is intended to receive regular reports of air conditions in different localities and to circulate these for the information of the pilots. As every acroplane will have either a name or distinguishing unber, it will be possible to send telegrams from any part of the world or from any ship to an aeroplane. It is intended that this organization will be ready by the time the peace treaty is signed.

Arrangements recently have been made for the erection of wireless stations in the extreme parts of China, one on the frontier of Cashmere and another on the Chinese side of Silberia. Mr. Isaacs has arranged with Handley Page for the transport of the necessary machinery by one or more of his big machines. The journey inland will take two or three days in place of the same number of months.

A Free Hand for the Manufacturer

Now that we know how we stand about commercial aviation there is one matter upon which we must have a clear understanding. In common with others we are anxious to make certain that when the Government gets a firmer hold on aviation the tendency will not be to create or encourage monopolies and to freeze out the smaller firms. In this country we have no liking for the trust or anything resembling it. It is a bad old principle to allow any giant enterprise to get the control of anything, for the reason that not only does it lead to graft and other evils but it kills individuality. The latter quality has placed us where we are, not only in aviation but in all branches of the national work. At the beginning of the war, while some of the larger munition works were struggling to reorganize their methods, it was the small shop which came to the rescue and enabled us to meet the great demands made upon us. Similarly, some of the lesser aviation manufacturers, working at first without a great deal of assistance-and, if the truth be told, without any too much encouragement- have made good and contributed in no small measure to the supremacy we have won. We must continue to give these firms free facilities to develop the schemes which they have been formulating and which would have been put into operation but for the fact that during the war they have been tied down to a particular line or policy. We want competition. Without it we shall be in danger of getting into a rut. The big firms have done well and, we doubt not, will do still better work in the future. But there are, doubtless, firms which, so far, we have heard little about, who may have inventions or plans which will place us head and shoulders above our rivals. Are they to have a free hand? There can be only one answer to the question.



The Curties triplane which will undoubtedly be heard from in the speed competitions which will be a feature of the Aeronsulical Conveniton as Atlantic City in May

THE AERONAUTICAL EXPOSITION

L ARGE crowds of interested speciators have distributed by the department and the first three death of the Regiment Armory, under the assigned of the Manufacturers Aircraft Association, the exwecks Astata Accompletely described in law weeks Astata Accompletely described weeks Astata Accompletely described in Section 50 of the American Section 100 of the Accompletely described in Section 50 of the Accompletely described in Section 50 of the Accompletely described in Section 50 of the Manufacturers of the Section 50 of the Accomplete A

Admiral Usher

Admiral N. R. Usher Commander of the Third Naval District, told a large audience that America had advanced so far in aeronautics since its entrance into the war that it was only a question of a short time before the aeroplane will rival the railroad and automobile as a means

will rival the railroad and automobile as a means of transportation in this country. Vice-Admiral Albert Gleaves, formerly commandant of the New York Navy Yard, after viewing the exhibit, said:
"The part which has heen played by the aerial arm of the United States Navy justifies me

to be used by us for actual energy into the war, we recrease it at himse the formal war. But with that progress which you see in the Empairment of the Progress which you see in the Empairment of the Progress which was not been accepted to the progress of the progress of the progress which was not entirely as the progress of the progress was also progress of the country to another, which will present out the country to another, which will present out the progress was careful attention and interested appreciation of what the Amount and the progress and the progress was accepted at the progress of the

T, Kannard Thomson

Mr. T. Kennard Thomson, consulting engineer, said that how soon America will take to air flying of all kinds is up to Congress.

Quoting Assistant Secretary of War Crowell and Assistant Secretary of the Navy Franklin D. Roosevelt among hig men in the service who

tip of Manhetum, off the battery, four miles into the bay, for use as a flying held, some of Array and Navy coulds we had flown to New Array and Navy coulds we had flown to New Array and Navy coulds with the Lord Hadden hanger than was consumed in a last characteristic with the Lord Hadden hanger than was consumed in a last characteristic with the Navy Coulds with

General Guy Livingston

Gen. Guy Livingston, director of the British Air Service before the formation of the Air Min-istry, said:

Air Service perfore in, sometime in emphasize at this stage of serial development is the necessity for cooperation between the great nations. Let us place all our cards on the table, so that we help in the evolution of lighting. America and Great Britain, more particularly, should get to-

Great Britain, more particularly, norms as extensionally, I don't think it matters a bit who first crosses the Atlantic—America, France, Italy Circal Britain, the Atlantic will be crossed this year; in fact, I think it will be accomplished within the eart two or three months. It is present to the complex of the property of the prope

some rears ago in the crossing of the English
Talkhan came stitlin a few pards of the English cases with a few pards of the English cases river by angled stick has. Then it
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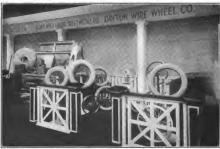
sense of Americans wan queen researched if irre-sponsible companies are formed, which make queat and impossible promises and then sell atock to the public, giving a very small or no return. The story is no good that it across a pity the public, and an across the public of the public, and the public of the public of the public of the public of the public. I am quite convinced that if some



The Gallaudet Aircraft Corporation's Exhibit—the small manoplans in contrast
Model S Seaplans

in azing that the possibilities open to this new much has been accomplished with the minute process of the proc

declare New York City laggard in appreciating the present necessity for landing and getting off facilities for aircraft, Mr. Thomson outlined a project which he said he had presented to Con-gress and the President for extending the lower



A view of the accessory section, shawing Standard Parts Co., Ajax Auto & Aero Sheet Metal Co., and Dayton Wire Wheel Co.

one told the public right now that it was possible to by an arregistar a five limited miles in burn to be an arregistar a five limited miles in burn to be a second or the second of the

Secator Key Pittman

them."

Seather Key Pittuan and the seather of ping from Wathington in a Glem L. Martin bombing plane, the party could find no place in New York Live cola, Sensor Key Pittuan of Nyada urged New Policy of the Seather of the Seather

crowd at he onter by saying that after fifteen minuten in the are left just as after as thought.

"I want to any to you," the Senator continued, "That total for the first their in my life! I rode to the state of t

about."

After viewing the exhibits, Senator Pittman reiterated that support should be given aerial

navigation and that he would do his part toward passing any hee that would all the development and the passing any hee that would all the development of the passing and the passing with other are mail officials, was the "A radio direction finder," and Mr. Praeger, and the passing with other are mail officials, was the "A radio direction finder," and the passing an

This announcement was of particular signifi-

treen New York, and Chicago. Service, between Cleveland and Chicago will begin forst, Mr. "We stand one at the threshold of commercial existion," Mr. Pragger and in his speech, "We stand one military flying and commercial avaistion," Mr. Pragger and in his speech, and the speech of the speech of



The SVA biplane constructed by Gio Ansaldo & Co.

cance because of Mr. Praeger's definite statement made earlier in the day that the New York-Chicago Aerali Mail Service would be in opera-tion of the control of the control of the con-trol of the control of the control of the the service could be extended to St. Louis, Omaha, Minneapolis and St. Paul. Mr. Praeger's plans call for the me of 18 special ships, which have been promised by the manufacturers by April 13. His achieved and for might service of from eight to ten hours be-

single motor plane will remain in the air only the property of the property of

may be reedily judged from the restarshale perthe mail daily between New York and Wash.

"Hencewoon May 15, 1918, and March, I. 1915,
the Areal Man (operations between 15, 1918,
the Areal Man (ope



The exhibit of the B. F. Goodrich Ca., which attracts much attention



The Packard Biplane, with special 8 cylinder Packard aviation engine

The Goodyear Exhibit

The Goodyner Exhibit

One of the most chalorate and interesting exhibits at the most chalorate and interesting exhibits at the most chalorate and interesting exhibits at the most chalorate of the Goodyner Tree and Kuber Company of the Control of the Goodyner of the Control of



The Boeing Seaplane, described in detail elsewhere in this issue

"There is one more problem-a most essential problem to successful commercial navigation. Aeroplane manufacturers must solve this. It is the problem of landing your plane on a small plot of ground. There is no use in arguing against this proposition. Aeronautical engineers must solve that problem to make the aeroplane a complete success. Until that problem is solved, forced landings or landings even on prepared fields will not be robbed of their terrior, of their danger to life, and their danger to property. The man who will show us how to flutter the aeroplane down as a bird lights will have done almost as much for aviation as Langley and Wright, who have shown us how to fly. When you solve that problem, everybody will fly and aeroplane factories will have to operate their shifts a day to supply the demand. If you do not solve this, the manufacturers will have trouble finding market enough to keep one shift going omically."

propeller on the ground, and one applicant for a position as pilot lost his life in flying a De Haviland plane to demonstrate his ability. This is a record in daily cross-country flying, in all kinds of weather, with a parallel, and shows that commercial flying is not in the same dangerous class with stunt or military flying.



The Goodyear Tire & Rubber Co. Exhibit

plies before the war, so that when our country entered the war, and an immediate need came up for halloons, this company was in position to commence prompt manufacture of the lighter-than-air craft equipment that the Government

needed.

A big balloon pilot training school was estab-lished in which Goodyear men were trained as pilots and these pilots, in turn assisted in the training of the naval student officers, sent by the navy to receive instruction in the Goodyear estable. Since the cessation of hostilities the Government has taken over the Goodyear flying field and is now operating it as an experimental balloon station,

During the way about

During the war this country made and delivered to the Government 900 balloons of the different types shown at their booth at the exhibition.

The Navy Dirigible

The Navy Drigible
The most imposing exhibition at the Aeronauthic Slower was the property of the Control of the

THE TIPS 480 H.P. AERO MOTOR

Alta cooling is provided by means of fins all around the main hody of the engine, and nine tubular radiators built between the cylinders. Water circulation is provided around the entire body, eclinders, and inside of the sleeve value. Water is circulated automatically by a slow rotation (of) ervolutions per minute) of the main body, which body serves as a water jacket and radiator. This system climinates all water hosing and connectioning the state of the provided provided the control of the state of the st

A decompression valve is also provided in the main body. A special gear arrangement permits to obtain the most efficient speed of crankahati: 1,900 R.P.M., while the propeller revolves in the same direction at 1,000 R.P.M. The main body travels in an opposite direction at the rate of 60 R.P.M. This special disposition climinates vibration and prevents gyroscoic action.

The arrangement of the planetary and eccentric gear mechanism provides an effective distribution of the rotary sleeve valves.

A lapered rotary sleeve valve, water cooled internally, is self-lubricating and automatically self-adjusting. This valve is spiral driven by the main planetary gear mechanism. Each sleeve operates a pair of cylinders for both inlet and outlet. The sleeve housing is of cast iron provided with graphite self-lubricating spots.

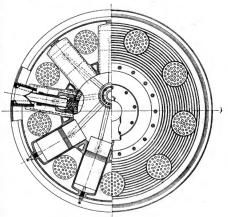
Oil for lubrication is forced under pump pressure through the crankshaft and bearings and splashed regularly by the slow rotation of the main body. The carburetor and oil pump body is made of one single aluminum casting.

A special design of obturators gives a maximum degree of safety of functionment in the cylinders, provides ideal lubrieation and helps to obtain an efficient compression.

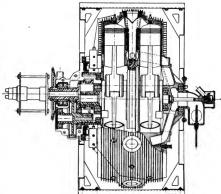
The general specifications of the Tips are motor are as follows:

Number of cylinders. eighteen Bore. 4½ inches Stroke. 6 inches Max. B.H.P. 480

Weight complete including cooling system850 lbs. Consumption gas per hour......22 gal. Consumption oil per hour....... 3 gal. Water capacity, main body......10 gal. Compression ratio...... 1 to 51/4 Volume of one cylinder 95.426 cu. in. Total volume of cylinders . 1,717.669 cu. in. Area of one piston.......15.904 sq. in. Piston speed per minute..... Vel. of gas on main inlet. . 141 ft. per sec. No. of sleeves per pair of cylinders.....1 No. of obturators per pistou....3 doubles



Half-section and rear view of the Tip Aero motor



Transverse section of the Tipa Aero motor



Brigadier General Theodore C. Lyster and the group at aerosautic authorities who tendered him a funcheon at Acro Club af America

GENERAL LYSTER AWARDED DISTINGUISHED SERVICE MEDAL

BRIGADIER GENERAL THEODORE C. LYSTER, U.S. Air Medical Service, "The Man Who Saved the Lives of Hundreds of Aviators," who was awarded the Distinguished Service Medal by Secretary Baker for his valuable work in establishing the Arr Medical Standards and organizing the Air Medical Service in this country and in France, was tendered an important reception at the Acro Club of America, which was attended by famous Allied

General Lyster arrived in New York unexpectedly and went to the Acro Club, which is the headquarters and meeting place of Allted Aviators. The Club had been advised from Washington, that Secretary Baker had awarded General Lyster the D. S. M. in recognition of his valuable work as head of the Air Medical Service, and the Aces and other officers present were just preparing a resolution of appreciation for him when the General walked in the Club.

when the General walked in the Club.

Those present at the lunchron were: Captain Augustine
Those present at the lunchron were contended to the control of the control of the control
Sheets at the control of the control
Sheets at the control of the Club; Henry A. Wise
Wood; Captain Jacques, Boyriven, the noted French Aviasor
Wood; Captain Jacques, Boyriven, the noted French Aviasor
Wood; Captain Jacques, Boyriven, the noted French Aviasor
Sciencis; Captain Jacques, Boyriven, the noted French Aviasor
A. Leo Stevens, Chief Inspector of the U. S. Army Balloon
Sciencis; Captain Granville A. Pollock, late of the Lafayette
Esquadrille, who has just returned from France where he
tended for the American Forces were tested; Henry Woodtended for the American Forces were tested; Henry Wood-

house; Lieutenant de Limur, of the French Mission, who went in the war with Captain Laboulee in 1943; Lieutenant Wainwright Abbott, late of the Lafayette Escardifte; Captain S. Heighert Majees, U. S. A., the well-known sportsman of Tuxedo Dark; Captain M. Edigonts, of the Special Guaternals of Lagotte Escardifte; Captain M. Loging, and the Captain R. Loging, and Captain R. Laking, U. S. Air Medical Service; Captain R. Loging, C. Lagotte, H. Lixing, U. S. Air Medical Service; Captain R. Loging, C. Lagotte, L. Laking, U. S. Air Medical Service; Captain R. Loging, C. Lagotte, M. Laking, U. S. Air Medical Service; Captain R. Loging, C. Lagotte, M. Laking, U. S. Air Medical Service; Captain R. Loging, C. Lagotte, M. Lagot

he had been told by Allied authorities that when General Lyster and Lieut. Colonel Isaac H. Jones, of the Air Medical Service, went to France, Italy and England in 1912 and 1918 and brought to the attention of the Allied Government the U. S. Air Medical tests and system of testing men for several tests and system of testing men for several tests in the Air Service due to accidents. General Lyster and Leut. Colonel Jones proposed a system for testing avaitors; physically and keeping them in good physical condition, which solved the most difficult problems. It was the system or forgunated by General Lyster and application of this system the occupance of Casualties from accidents were cut down greatly.

SECOND PAN-AMERICAN AERONAUTIC CONVENTION AND EXHIBITION

To Be Held Under the Auspices of The Aero Club of America. The Aerial League of America and the Pan-American Aeronautic Federation.

> From Thursday, May 1st, 1919, June 1st. inclusive. Atlantic City, N. J.

CONTESTS TO BE HELD EACH SATURDAY

- (1) Seaplane Contests (general).
- (2) Curtiss Marine Flying Trophy and Prizes,
- (3) Intercollegiate Seaplane Contests,
- (4) Land Aeroplane Contests.
- (5) Dirigible Contests.
- (6) Kite Balloon Speed in Ascending and Descending, and Maneuvering Contests,
- (7) Parachute Competition,
- (8) Aviette (bicycles and motorcycles with wings) Contests.

EVERY DAY ACTIVITIES

- (1) Exhibits of Aeroplanes, Motors and Accessories on the Steel Pier,
- (2) Demonstrations and tests of Seaplanes, Land Aeroplanes, Motors, Dirigibles, Kite Balloons, to prospective purchasers and representatives of different governments.
- (3) Aerial Passenger Carrying by seaplanes and dirigibles, and kite balloon ascensions,
- (4) Moving pictures and Addresses by leading authorities on most important phases of aeronautics.

The Governments and Aeronautic, Sporting, Scientific, Industrial and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are invited to send representatives to attend this great aeronautic event. On arrival in the United States these

to send representatives to attend this great aeronautic event. On arrival in the United States these representatives knowled call at the Headquarters of the Convention Committee at No. 29th Mann Arenue, New York City, to require and receive their official badget and the official program. In the center that it is more convenient for them to go directly to Atlantic City they will register that the state of the Arena that it is not a state of the Arena that the Arena the Chair and the Arena the Chair and the Arena that the Arena

be demonstrated.

All communications until May 1st, should be addressed to Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City.



DAILY PROGRAM FOR PAN-AMERICAN AERO-NAUTIC CONVENTION, EXHIBITION AND CONTESTS

THURSDAY, MAY 1ST

Opening of Convention and Exhibit.

AFTERNOON—Reception at Acronautic Hall on the Steel Pier. Addresses by United States Government State and aeronautic authorities.

EVENING-Aero Show and addresses by officials.

FRIDAY, MAY 2ND

AFTERNOON—Aero Show. Preliminary tests of seaplanes, dirigibles and kite balloons.

EVENING-Moving pictures and address on flying for sport and pleasure.

SATURDAY, MAY 3RD

AFTERNOON—Seaplane and dirigible races, and kite balloon ascending and descending contest.

EVENING-Balt.

SUNDAY, MAY 4TH

MORNING-Memorial service by eminent Divine for the dead airmen.

AFTERNOON AND EVENING—Reception to allied aces and heroes of the air and their parents, and announcement of the award of the Aero Club of America Medal of Valor, and the Aerial League of America Diploma of Honor.

MONDAY, MAY 5TH

AFTERNOON-First parachute contest for \$500 Bennett Prize,

EVENING—The Large Dirigible and Its Value for Transportation." Representatives of railroads, express, steamship and other transportation organizations invited to attend.

TUESDAY, MAY 6TH

AFTERNOON—Illustrated addresses on "Aerial Forest Patrol." Forestry Department of every State

EVENING—"Work of Aerial Police Squadrons, and Why Every City Should Have One."

WEDNESDAY, MAY 7TH

AFTERNOON AND EVENING—Acrial Mail Day. Illustrated address on, and consideration of, and Post Roads Committees of House of Representatives and Senate, and Postmaster General Burleson invited to deliver addresses. (26,000 United States Postmasters, and Chambers of Commerce of 13,000 cities invited to attend.)

THURSDAY, MAY 8TH

AFTERNOON AND EVENING—Illustrated addresses on the "Need of Municipal Aerodromes, and the Part to be Played by Aircraft in City Planning." Chambers of Commerce and City Planning Commissions of 13,000 cities invited to

FRIDAY, MAY 9TH

AFTERNOON—Arrival of seaplanes and army planes from Army and Navy Air Stations. Second parachute competition for the \$500 Bennett Prize.

EVENING—Illustrated addresses on "Latest Develop-ments in Aerial Warfare and Adventures in Aerial Warfare," told by famous aces.

SATURDAY, MAY 10TH

AFTERNOON-Army, Navy and Marine Corps Day. Aerial contests and tournament,

EVENING-United States Army and Navy Officers' Reception. Reception and addresses at Aero-nautic Exhibition Hall on the Steel Pier.

SUNDAY, MAY 11TH

AFTERNOON AND EVENING—Presentation of the flags by each State of the United States to the Aero Squadrons representing the States. Each State will present a flag to each Aero Squadron, the members of which were over-Squaaron, the members of which were over-whelmingly natives of that State. The presenta-tion will be made by representatives from the State and the Aero Club and Aerial League branch of that State. All States and cities in-vited to send delegates, and Army, Navy and Marine Corps to send representatives.

MONDAY, MAY 12TH

AFTERNOON-Demonstrations and illustrated addresses on the "Value of Aircraft for Advertising by Day and by Night." All national advertisers and advertising agents invited to attend.

EVENING—"Pan-American Aerial Transport Over Land." Addresses by members of the commis-sions of the 20 Latin-American Republics.

TUESDAY, MAY 13TH

AFTERNOON AND EVENING—"Pan-American
Aerial Transport Over Water." Addresses by
members of the 20 Latin-American Republics' Commissions

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH

AFTERNOONS AND EVENINGS-"The Airways and Aerial Transport in Europe, Canada, Africa, Australia and Asia

FRIDAY, MAY 16TH

AFTERNOON AND EVENING-"Aerial Navigation Instruments for Flying Over Land and Aviators, navigators, scientific instrument makers and aeronautic experts invited.

SATURDAY, MAY 17TH

APTERNOON—Aerial races and contests. Illustrated addresses on Aerial Photography.

EVENING—Extensive exhibit of aerial photographs and photographic apparatus. All photographers, professional and amateur, and makers of photographic apparatus invited.

SUNDAY, MAY 18TH

AFTERNOON AND EVENING—Illustrated ad-dresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey."

MONDAY, MAY 19TH

AFTERNOON-Addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators.

EVENING—Illustrated address on "How Army Medi-cal Standards and Inspection Lessen Accidents." Insurance companies and agents invited.

TUESDAY, MAY 20TH

AFTERNOON AND EVENING-Illustrated addresses showing different ways of crossing At-lantic by air and the problems to be solved to accomplish same successfully,

WEDNESDAY, MAY 21ST

AFTERNOON—Aero Safety Day. Discussion of aero safety provisions made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in

EVENING—"Progress Made in the Art of Piloting Aeroplanes." Illustrated.

THURSDAY, MAY 22nd

AFTERNOON AND EVENING-Addresses and discussions of meteorology-"How the Weather Forecasts Can be Extended and Made More Efficient by the Use of Aircraft in Exploring the Upper Air," also "How the Weather Forecasts Help Aerial Navigation," and "Telegraphic and Climatic Factors in Relation to Aeronautics.

FRIDAY, MAY 23RD

AFTERNOON AND EVENING-Addresses on "Aerial Jurisprudence—Aerial Laws and Regula-tion of Air Traffic." (First day.) Lawyers, traffic commissioners and police authorities of different countries invited

SATURDAY, MAY 24TH

AFTERNOON—Races and contests.

EVENING—Illustrated address on "Need of Establishing Altitude Levels for International, Interstate and Interurban Air Travel.

SUNDAY, MAY 25TH

AFTERNOON AND EVENING—Aeronautic Art Day. Address on "Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paintings," by Lieut. Farre, Lieut. Ruttan and Paintings," by Lieut, Farre, Lieut, Ruttan and others. All prominent artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK.

MONDAY, MAY 26TH

AFTERNOON-"Aeronautic Engineering Problems and Their Prospective Solution."

EVENING—Opening of contests for designs and ideas for large aeroplanes.

TUESDAY, MAY 27TH

AFTERNOON-"Factors That Increase the Efficiency

for Large Dirigibles."

EVENING—"Advantages of Veneer and Plywood for Aircraft Construction.

WEDNESDAY, MAY 28TH

AFTERNOON-Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective Solution."
EVENING—"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON—"Flying Boats Versus Hydroaero-planes for Sport and Transportation."

EVENING—Contest for designs and ideas for large

aeroplanes. FRIDAY, MAY 30TH (Memorial Day)

AFFERNOON-Dirigible races, kite balloon speed ascending contest; parachute contest.

EVENING—Reception at the Aeronautic Hall, Steel

SATURDAY, MAY 31ST

AFTERNOON-Seaplanes, land planes and dirigible contests. Aviette competition at which all cyclists and makers of bicycles and motorcycles will be

EVENING—"International Medical Standards for Aviators in War and Peace." Reports from dif-ferent countries illustrated with attractive films. 50,000 medical men invited.

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING-Award of prizes and diplomas for all events.

PROGRAMME

Deuxième Convention et Exposition Aeronautique Pen-Américaine Sous les euspices de l' "Aero Club of America," "The Aerial League of America," et la

Sous les suspices de l' "Aero Club of America," "The Aerial League of America," et la
"Pen-America Aeronautic Federation."

Du Jeudi I Mai, 1919 su I Juin, inclus. è Atlantic City, N. J.

Concours d'hydravian.

Z. Trophers et l'Et Court Service. L' Trophers et l'été Centrale pour Aviation Navale.

Cascours Intercallegians pour Hydraviens. Cenceurs d'Ariena.

Cenc

pragramme ci-dessous:—

JEUDI, LER JOUR
Obverture de la Couvention et Espoiltion.

Obverture de la Couvention et Espoiltion.

Obverture de la Couvention et Espoiltion.

d'accire. Discours par des autorités du Gouvernement.

Sois—Des États-Unis, et l'État et de l'Aeronantique Exposition aeronantique et discours par des personnages officiels.

position arronantique et discours par des personanges officiels. VENDREDL JEME JOUR Après mèlle Espais préliminaires. Après mèlle Espaision a renautique l'espais. De prevenue directels et lailour capité. Parlaiton en tata que sport, et agréneul. AMEDI, JEME JOUR PROPERTIES DE L'ARREST DE

Seir-Bal. DIMANCHE, 41EME JOUR

Solvandicute, 4EME JOUR
Matins—Service pour is mémoire des aviateurs morts.
Apràs-malit, at solvées-Reception des As Alliés et Hères de
Apràs-malit, at solvées-Reception des As Alliés et Hères de
Apràs-malit, at solvées-Reception des As Alliés et Hères de
Lissus Artivinne d'Amerique et du diplome d'Honneur de la
Lissus Artivinne d'Amerique et du diplome d'Honneur de la
Lissus Artivinne d'Amerique et du diplome d'Honneur de
Après-malit perimer concours de Parachutes pour le Prix Benment et Josean de la prix de

chaque ville devrait en posseiler.

MERCRED, ILEME JOUR

Après-naldi-Journée de la poste aérienne. Conférences avec
projections; considérations sur les avions postaux. Le
postales au Sénait et à la chambre, et le Directeur Général
des Postes, Burleson, sont invités à prononcer des discons;
(Jóco Directeur des Postes des Estats-Unis et des représentants des Chambres de Commerce de 1,000 villes y sont

DEUD, SIEME JOUR Aprà-midi et sair-Discours avec projections sur la nécessité d'Accordonnes municipaus par partir d'arrait de la con-merce et les commissions de City-planning" de 13000 villes

merce et les commissions de city-pessions de profit sixtés. JEME JOUR Après-nielle Arrivée d'aviens et hydravions militaires de leurs différents centres. Deuxième concours de Parachutes pour le prix Bennett de 190 dollars. Solf-Coniference avec projections par des As celèbres, sor les derniers d'éveloppements de la guerre aérienne et sur leurs aveniures pressunéels.

leura aventures personneles.

SAMEDI, absEME JOUR

Après-midi--Journée, de la Marine et des fusillera marins.

Salis-Réception d'officiers de l'Armée et de la Marine Américaine. Réception et discours au hall de l'Exposition Aeronautique sur la Jetée d'Actier.

nautique sur la Jetée d'Acier.
DIMANCHE, IIEME SOUR de dappaus, par chaque. Est
Après-mille et seit—l'yestation de dappaus, par chaque. Est
Après-mille et seit—l'yestation de dappaus par chaque.
Est d'Ofrica un drapeau à chaque eccadrillé con la majorité
des membres sont originaires de cet Esta. La présentation
et de la branche de la Ligar Acienne de cet et esta. (Tous
les Estas et villes sont invités à envoyer des délégues, et
l'Armes et la Marier à envoyer des délégues, et
l'Armes et la Marier à envoyer des délégues, et

LUNDI, LIBER JOUR ACTORISCHE STEPPERSON SUR APRÈ-MINI-DEMONATORISCHE DE STEPPERSON SUR APRÈ-MINI-DEMONATORISCHE DE STATEMENT DE STATEME

par des memores des commisses de Américaines Américaines (MARDI, INIEME JOUR Après-midi at soir-Transport aérien intercontinental Pan-Américaine. Discours par des membres des commissions de 20 Républiques Latines Américaines (DAR JOUR)

MERCREDI ET JEUDI, 141EME ET ISIEME JOUR Après-midi at solr-Les voies afriennes et le transport aérien en Europe au Canada en Afrique en Australie et en Asie.

VENDREDI, IsleME JOUR Après-midi at soir-Instruments de Navigation aérienne pour voler au-dessus de la terre on de l'eau (aviateurs, navi-gateurs, fabricants, d'instruments scientifiques et experts en

aeronautique invité).
SAMEDI, HIEME JOUR
Après-midi-Courses et consonrs aériens. Conférences et prorections sur la photographic aerienne.
Prétions sur la photographic aerienne.

conférences et proprétion sur la photographic professionels, et amaciurs, et les labricants d'appareils bodographiques (Les photographiques professionels, et amaciurs, et les labricants d'appareils photographiques sont

DIMANCHE, HIEME DOUR
Après-midi at sale-Conférences sur la nécessité d'une attitude
pluslarge en cregard de l'assurance pour l'avion et les
aviateurs.
Sel-Conférences avec projections. Comme quoi les meures
médicales et les inspections en riqueur dans l'armée
médicales et les inspections en riqueur dans l'armée
médicales et les cocients. (agrati et compagnée d'assurance,

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pection).

JEUDI 21EME JOUR
Après-midi et anir-Conférences et discussions sur la
Après-midi et anir-Conférences et discussions sur la
Neterorlogie, Comma quoi les bulletins meteorologiques
de l'avion pour explorer les plus hautes couches de l'atmosphère. Comme quoi es sublietins méteorologiques son
d'assistance à la navigation aérienne. Les facteurs
elimatérique et leur relations à l'accolimatérique et leur relations à l'acco-

neutique. VENDREDI, 211EME JOUR Après-midi et soir-Conférences sur la jurisprudence aérienne. Lois et reglements sur le trafic aérien (ler jour). Avocats. commissaires de trafic, autorités de police de différents pays.

commissaires de trafic, sutorité de police de différents pars. SAMÉDI, AIREM FOUR.
Après-milé et sobr-Courre et concours. Confireres avec prorecruition service production de la concours de la concourse de

MARD, JIEME JOUR
Apris maled.—Scenario quagmentent l'efficacité des grands
Soir—l'es avantage du phiquage et contre plaquage dans la
MERCRED, allemé JOUR
Après maled.—Conferences sur le problème du voi à une attitude
Après maled.—Conferences sur le problème du voi à une attitude
L'EUR, BIEME JOUR
AUGUST DE L'

transport.

oir Concours pour les idées et projets de granda avions.

VENDREDI, 'MEME JOUR-"Memorial Day",

Après-midi-Courses de dirigeables; concours de rapidité d'ascension paur ballons eaptifs; concours de parachutea.

Soir-Réception au Hall de l'Aeronautique. Jetee d'acier.

Soft-Acceptions au man de l'actionnaissue. Jete à sceri. Après-midi-Conçours d'avoins, d'hydravions et de dirigeables, Concours d'aviettes auquel les cyclistes et les fabricants de cycles et monteryclettes soront invités. Le consorte de la commentation de la c

DIMANCHE, MIEME JOUR Après-midi at soir-Remisa des prix as diplômes pour tous concours rt courses.

on Europe au Canada en Afrique en Australie et en Asia. Concours et courses.

Le Gauvermenne Francis, les aganatations afrancisques, aportives, estentifiques, industrielles, et civiques de Franca sent invités à sevoyer des représentants par activer le cette prainte convenien airenantique. Le représentant par la convenient des la convenient de Contine de la Convenient de la convenien

NO PROPERTY DE LA CONTRACTOR DE LA CONTR

LA SEGUNDA CONVENCION Y EXPOSICION AERONAUTICA PAN-AMERICANA

Celebrada Bajo Los Auspicios del "Aero Club of America," "The Aerial League of America" y "The Pan-American Aeronautic Federation".

Desde el Jueves Primero de Mayo Hasta el Primero de Junio, Ambos Inclusives de 1919 En Atlantic City, Estado de New Jersey, Estados Unidos de America

PROGRAMA

Concursos Que se Verificaran Todos Los Sabados:

- Concurso de Hidroaeroplanos (en general). Trofeo y Premios de Curtiss por Aviacion Maritima.

- Maritima.
 Concurso de Hidroplanos Entre Universidadea.
 Concurso de Aeroplanos Terrestres.
 Concurso de Globos Dirijibles.
 Concurso de Globos Sobre Velocidad en Ascender y Descender y sus Maniobras.
 Concurso de Paracadas.
 Concurso de "Aviettes" (bicicletas y motocicleConcurso de "Aviettes" (bicicletas y motocicletas con alas).
- tas con auss).

 **Programa Diario

 (1) Exhibición de Aeroplanos, Motoras y sus Accesorias en el "Steel Pier."

 (2) Demostracion y Ensayos de Hidroaeroplanos, Aeroplanos Terrestes, Motoras, Globos Dirijibles y Globos Cautivos, Para Compra dores.
- Ascencion de Hidroplanos y Dirijibles con
 Pasajeros y Globos Cautivos.

 Vistas Cinematografas y Discursos Sobre Las
 Fases Mas Importantes de la Aeronautica,
- Como Siguen:

JUEVES PRIMER DIA

- Apertura de la Convencion y Exposicion

 EN LA TARDE—Recepcion en el salon aeronautico
 en el "Steel Pier." Discursos de los funcionarios
 del gobierno de los estados Unidos de America,
- del estado y de las sociedades aeronauticas.

 EN LA NOCHE—Exposicion aeronautica y discursos de funcionar

VIERNES SEGUNDA DIA

- EN LA TARDE-Exposicion aeronautica, ensayos preliminares de hidroplanos y globos dirijibles
- EN LA NOCHE—Vistas cinematografas y discursos sobre aviacion de sport y paseo.

 SABADA TERCER DIA

EN LA TARDE-Carreras de hidroaeroplanos y globos dirijibles y concurso en ascender y descender de globos cautivos.
EN LA NOCHE—Gran baile.
DOMINGO CUARTO DIA

- LA MANANA-Serivios conmemorativos en honor de los aviadores difuntos por un prelado
- EN LA TARDE Y NOCHE-Recepcion a los avia-
- dores mas renombrados aliados y a sus familiares y entrega de la medalla de valor del "Aero Club de America" y del diploma de honor de la "Aerial League de America."

LUNES QUINTO DIA

- EN LA TARDE-Primer concurso de paracaidas por
- EN LA TARDE—Primer concurso de paracaídas por de premio de quintetos dollars de hementa-alor en la transportación. Representantes de empresa de ferrocarral, expreso, vapores y leas de transportes quedan invitados para asistir. MARTES SESTO DÍA EN LA TARDE—Discursos con ilustraciones, de patrulla aeria de montes. (El departamento de patrulla aeria de montes. (El departamento de

montes de cada estado queda invitado.)

EN LA NOCHE-Trabajo de vigilancia policiaca aeria y razones por las cuales toda ciudad debe tener esta clase de servicio.

MIERCOLES SEPTIMO DIA

EN LA TARDE Y NOCHE-Dia de correos aerios. A TARDE Y NOCHE—Dia de correos aerios, Discursos con litustraciones y estudio de aero-planos para servicio de correos. El presidente de sentantes y el de igual comite del senado aci como el ministro de comunicaciones de los Estados Unidos Sr. Burleson. Quedan invisidos para lundos supera la comunicacione de los estados para del correo de la comunicacione de los del dores de correo de la comunicaciones de los estados dores de correo de la comunicaciones de los estados dores de correo de la comunicacione de la comunicación de correo de la correo de la comunicación de correo de la correo de la comunicación de correo de la correo del correo de la corr ras de comercio de trece mil ciudades quedan invitados para asistir.)

JUEVES OCTAVO DIA

EN LA TARDE Y NOCHE-Discursos con ilustraciones sobre las necesidades de aerodromos mu-nicipales y de la parte que debe tomar la aero-nautica en los proyectos de ciudades. (Las camaras de comercio y las comisiones de proyec-tos de ciudades de 13,000 ciudades quedan invitadas para asistir.)

VIERNES NOVENO DIA

- EN LA TARDE-Llegada de hidroplanos y aeroplanos del ejercito y la Marina de sus respectivas estaciones. Segundo concurso de paracaidas por el premio de \$500 de Bennett.

 EN LA NOCHE—Discursos con ilustraciones de los
- mas recientes desarollos en la guerra aeria y hazañas relatadas por famosos aviadores,

SABADO DECIMO DIA

- EN LA TARDE-Dia del Ejercito y Marina. Concurso
- EN LA NOCHE—Recepción a los oficiales de la Marina y Fjercito de los Estados Unidos. Recep-ción y discursos en el Salón de Exhibición Aero-nautica en el "Steel Pier."

DOMINGO ONDECIMO DIA

EN LA TARDE Y NOCHE—Presentación de hande-ras por cada uno de los Estados de los Estados Unidos de America a sus respectivos escuadrones aereos. Cada Estado presentará una bandera al escuadron aereo respectivo que contenga el mayor número de naturales de aquel estado. La presen-tación se hara por los representantes del estado y del Club Aereo y Liga Aeria de aquel Estado. (Todos los Estados y ciudades quedan invitados para enviar sus delegados y el ejercito y marina para enviar representantes,

LUNES DUODECIMO

- EN LA TARDE—Demostraciones y discursos con ilustraciones sobre el valor de la aeronantica para anuncios de dia y de noche. (Todas personas y agentes dedicados al negocio de anuncios que-
- dan invitados para asistir.).

 EN LA NOCHE—Transporte aereo terrestre PanAmericano. Discursos por los miembros de las
 Comisiones de las veinte Republicas Pan-Ameriсапа с.

MARTES DECIMO-TERCERO

EN LA TARDE Y NOCHE—Transporte aereo mari-timo Pan-Americano. Discursos por los miembros de las Comisiones de las veinte Republicas Pan-Americanas

MIERCOLES Y JUEVES DIAS 14 Y 15 EN LA TARDE Y POR LA NOCHE—Dias y trans-portes aereos en Europa, Canada, Africa, Aus-

tralia y Asia. VIERNES DIA 16

EN LA TARDE Y POR LA NOCHE-Instrumentos para la aviación terestre y maritima. (Aviadores, navegadores, fabricantes de instrumentos cientificos y peritos en aeronautica quedan invitados.)

SABADO DIA 17

POR LA TARDE-Carreras y concursos aereos. Discursos con ilustraciones sobre la fotografia aerea. POR LA NOCHE—Exhibición extensa de fotografias aereas y aparatos fotográficos. (Fotografos, tanto los profesionales como los afisionados y fabri-cantes de aparats fotograficos quedan invitados.)

DOMINGO DIA 18
EN LA TARDE Y POR LA NOCHE—Discursos
con ilustraciones sobre la exploración aerea y
el uso de la aereonave para estudios geodéticos y de costas.

LUNES DIA 19

EN LA TARDE Y POR LA NOCHE-Discursos sobre la necesidad de un concepto mas âmplio relativo al seguro de aereonaves y aviadores. POR LA NOCHE—Discursos con ilustraciones sobre

la manera en que los requisitos e inspección medico-militares disminuyen el número de accidentes. (Compañias de seguros y agentes quedan invitados.)

MARTES DIA 20

EN LA TARDE Y POR LA NOCHE-Discursos con ilustraciones mostrando diferentes modos de cruzar el Mar Atlantico por el aire y los problemas que deben resolverse para realizar dicho objeto.

MIERCOLES DIA 21

EN LA TRADE—Dia de Seguridad Aerea. Dis-cusiones sobre las disposiciones hechas para la sceguridad aerea; mejoras en la construcción de aeroplanos; anmento de estabilidad en las motoras

aereas: divisas para aumentar la seguridad aerea. EN LA NOCHE-Progreso realizado en el manejo de los aeroplanos (con ilustraciones).

JUEVES DIA 22

EN LA TARDE Y NOCHE-Discursos y discusiones sobre metereologia-manera de extender los in-formes metereologicos y hacerlos mas eficaces mediante el uso de aeronaves en la exploración de las altas regiones del aire así como la manera en que los pronosticos metereologicos pueden ser de auxilio en la navegación aerea; y factores tele-graficos y climaticos en relación a la aeronautica. VIERNES DIA 23

EN LA TARDE Y NOCHE-Discursos sobre la jurisprudencia aerea-leyes aereas y reglamenta-ción del trafico aereo (primer dia). (Abogados Jefes de Trafico y Autoridades Policiacas de los distintos países quedan invitados.) SABADO DÍA 24

EN LA TARDE—Carreras y concursos. EN LA NOCHE—Discursos con ilustraciones sobre la necesidad de establecer lineas de altitud para viajes internacionales, entre los estados y entre las ciudades por medio del aire.

DOMINGO DIA 25

EN LA TARDE Y NOCHE-Da de Arte Aero-LA TARDE Y NOCHE—Da de Arte Aero-nautica. Discurso sobre la pintura y secultura aeronautica de los distintos paises y exhibición de los cuadros aeroes por el Teniente Farré, Teniente Ruttan y otros. (Artistas prominetes y directores de Salones de Artes y demás in-teresados quedan invitados.) SEMANA DE INGENIERIA.

LUNES DIA 26

EN LA TARDE—Problemas de ingenieria aero-nautica y su porspectiva solución. EN LA NOCHE—Apertura del Concurso para diseños

e ideas sobre grandes aeroplanos.

MARTES DIA 27

EN LA TARDE—Factores que contribuyen al aumen-to de la eficiencia de los grandes globos dirijibles. EN LA NOCHE—Ventajas de enchapear y de la madera denominada "plywood" en la construcción perconaves

MIERCOLES DIA 28

EN LA TARDE-Discursos sobre los problemas de volar a una altura de 25,000 pies y mas, y su solución prospectiva. EN LA NOCHE-Maquinas aereas de la actualidad. JUEVES DIA 29

EN LA TARDE-Tema: "Flying-boats" contra hidroplanos para sport y transporte.

EN LA NOCHE—Concurso sobre diseños e ideas para

VIERNES DIA 30

EN LA TARDE—Carreras entre globos dirijibles, concurso de velocidad de ascender y descender de globos cautivos; concurso de paracaidas. EN LA NOCHE—Recepción en el Salón Aeronautico en el "Steel Pier."

SABADO DIA 31

EN LA TARDE—Concursos de hidroplanos, aero-planos, y globos dirijibles. Concurso de "Aviettes" al cual serán invitados todos los bi-

"Aviettes" al cual serán invitados todos los bi-ciclistas y fabricantes de bicicleta y motoricletas. EN LA NOCHE—Requisitos medicos para aviadores en tiempo de guerra y de paz. Informes de dis-tintos paises ilustrados con vistas cinematografas de atractivo. (\$0,000 medicos quedan invitados.) DOMINGO DIA 32.

EN LA TARDE Y NOCHE-Presentación de premios y diplomas de todos los concursos,

Los Gobiernos de la Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Cuba, República Dominicana, Ecuador, Honduras, Haili, Panamá Guatemala, Paraguay, Peri, Portugal, El Salvador, Espaina, Uruguay, Venezuela, Mejico, y Nicaragua, asi como las Sociedades Aeronaúticas, Deportivas, Científicas, Industriales y Civicas, de los Mejico, y Nicarogina, así como las Sociedades Aeronaúticas, Deporticas, Cientificas, Industriales y Civicas, de los mismos países, por la presente quedan invitadas para embar representante a asistir a ecte gran consursa aeronaútico. Dichos representantes a sus llegada a los Istados Unidos debenda presentantes a la oficia principal del Comité cacargado de la Connección, me a la sinarce 237 Abrenda de Madiono, en la ciudad de New York, para incribires en la sinarce 237 Abrenda de Madiono, en la ciudad de New York, para incribires en la sinarce 237 anticomente de la comitenta de la comitencia de la convención tendra entre desta constituidas en dicho lugar en las signientes heteles: "Traymore." (Chalfonte, "The Breakers," "St. Charles," "Marborough-Blenkeim," "Chelson, "Almacci," "Plemmir" y "Hoddon Hall:"
"Plemmir" y "Hoddon Hall:"
"Plemmir" y "Hoddon Hall:"
"Traymore al convención deronaútica en dichos hotelesquienes especiário las credenciales o chapa oficiales de nestada al protector para el Salón Aeronaútico, la Espasición de coronaítica en el Steel Pier", la acción apartada para decreasión y medion de la convención tendra considera de la convención tendra considera de la convención tendra considera de la convención tendra y para motora.

Sírvase dirijir todas sus comunicaciones hasta el primero de Mayo Próximo venidero, al Sr. Contraalmirante Peary, en la forma siguiente: Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City.

SECONDA CONVENZIONE ED ESPOSIZIONE AEREONAUTICA PAN-AMERICANA

Sotto gli Auspici dell'Aero Club of America, dell'Aerial League of America e della Federazione Aeronautica Pan-Americano

Dal Primo Maggio 1919, al Primo Giugno incluso,

Atlantic City, N. J.

PROGRAMMA

GARE CHE AVRANNO LUOGO OGNISABATO

Gare Idroplani (generale).

Voli nautici apparecchio tipo Curtiss-Trofei e Premi.

Gare Idroplani (Universita). Gare Aeroplani di terra.

Gare Dirigibili.

Gare Velocita ascesa e discesa, e manovre di Palloni frenati. Gare Paracadute.

Aviette (Velocipedi e motocicli alati).

AVVENIMENTI OUOTIDIANI

(1) Esposizione di Aeroplani, Motori ed accessori sullo Steel Pier (Ponte

d'Acciaio).
(2) Esercitazioni e prove idroplani, Aeroplani di terra, motori, Dirigibili, Palloni frenati.

(3) Trasporto Aereo passeggeri su Idroplani, e Dirigibili-Ascensioni Palloni frenati

Spettacolo cinematografico e discorsi sul elpiu importanti fasi dell'Aereonautica, nell'ordine seguente:

GIOVEDL 1MO GIORNO

Apertura Convenzione ed Esposizione.

POMERIGGIO Ricevimento nella Sala Aereonautica sullo Steel Pier. Conferenze Autorita Federali, Statali, ed Aereonautiche,

SERA-Esposizione Aereonautica e discorsi ufficiali.

VENERDI, 2DO GIORNO

POMERIGGIO—Esposizione Aereonautica—prove preliminari, idroplani, Dirigibili, e Palloni Frenati. SERA—Cinema e conferenza-soggetto "Aereonautica Sportiva.

SABATO, 30 GIORNO

POMERIGGIO-Corse Idroplani e dirigibili: gare di velocità ascesa e discesa Palloni frenati.

DOMENICO, 4TO GIORNO

MATTINO-Un eminente Ecclesiastico commemorerá Aviatori defunti

POMERIGGIO E SERA-Ricevimento "Assi" alleati ed eroi dell'Aria e loro parenti—Anninzio con-ferimento medaglia al valore dell'Aero Club of A. e diploma d'onore dell'Aerial League of America.

LUNEDI, 5TO GIORNO

POMERIGGIO-Prima Gara Paracadute. Premio

PennettudiO—Prima Cara Paracadute. Premio Bennett \$500. SERA—Il Dirigibile di grosse dimensioni e la sua uti-lità per trasporti. Sono invitati i Sigg. Rappre-sentanti delle ferrovie, dell Compagnie di Ex-press, delle Compagnie di Navigazione e di aktiservizi-trasporti.

MARTEDL 6TO GIORNO

POMERIGGIO—Conferenze con proiezioni sulla "Guardia Forestale Aerea" (Sono invitati i rappresentanti dei Dipartimenti forestali di ogni Stato.)

SERA—Polizia aerea (squadre) e le ragioni per le quali ogni città dovrebbe averne una.

MERCOLEDI, 7MO GIORNO

POMERIGGIO E SERA—Giornata "Posta Aerea". Conferenza con proiezioni—Considerazioni su la "posta aerea". Sono invitati a parlare: il Capo del Comitato ufficio Posta e servizio Stradale della Camera di Deputati e del Senato e il Diret-tore Generale della Posta, Sig. Burleson (20,000 impigati postali ed i rappresentanti delle Camere di Commercio di 13,000 città).

GIOVEDI, 8VO GIORNO

POMERIGGIO E SERA-Conferenza con projezioni sulla necessità di costruire aerodromi municipali e sull agrande influenza che gli aeroplani avranno nella costruzione e nello sviiuppo delle nuove città. (Sono invitati i Commissari delle Camere di Commercio e degli uffici Planimetrici mimicipali di 13.000 città.)

VENERDI, 90 GIORNO

POMERIGGIO-Arrivo di Odroplani e di aeroplani dell'esercito da stazioni aeree dell'esercito e della Seconda gara paracadnte premio Benmarina. nett \$500.00.

SERA—Conferenza con proiezioni sui recentissimi pro-gressi della lotta aerea narrate da famosi "Assi,"

SABATO, 10MO GIORNO

POMERIGGIO-Giornata in onore dell'esercito e della Marina-Gare Aeree e tornei. SERA-Ricevimenti Sigg. Ufficiali dell'Esercito e della

S. U. Trattenimento e discorsi nella sala dell'-Esposizione Aereonautica sullo Steel Pier.

DOMENICA, 11MO GIORNO

TANKANDARAN DARI KANDARAN KANDARI KANDARAN BANDARAN BANDARAN KANDARAN BANDARAN KANDARAN KANDARAN BANDARAN BANDAR

POMERIGGIO E SERA—Presentazione delle ban-diere da parte di ciascun Stato degli S. U. alle soundre aeree che li rappresentano. Ciascun Stato presentera una bandiera a ciascuna squadra aerea, i membri della quale saranno possibilmente tutti nativi dello Stato che rappresentano. I rap-presentanti delle succursali in ogni Stato dell'-Aereo Club e dell'Aerial League faranno tale rappresentazione. (Ciasun Stato e ciascuna città sala Marina a mandare rappresentanti.)

LUNEDI, 12MO GIORNO

POMERIGGIO—Conferenze illustrate sul valore della macchine deree come mezzi di "reclame" di giorno e di notto. (Sono invitati tutte le compagnie di pubblicita nazionali ed estere.)

SERA-Trasporto Aereo Pan-Americano su Conferenze di membri delle Commissioni delle venti repubbliche America-latine,

MARTEDI, 13MA GIORNATA POMERIGGIO E SERA-Trasporto Aereo Pan-Americano sopra acqua. Conferenze di membri delle Commissioni delle venti repubbliche Americo-Latine

MERCOLEDI, E GIOVEDI, 14MO E 15MO GIORNO POMERIGGIO E SERA-Le Vie Acree ed il Tras-

porto Aereo in Europa, Canada, Africa, Australia ed Asia.

VENERDI, 16MO GIORNO

POMERIGGIO E SERA-Istrumenti di navigazione Aerea per voli sopra terra e sopra marc. (Sono invitati aviatori, naviganti, fabbricanti strumenti scientifici a periti aereonautici.)

SABATO, 17MO GIORNO

POMERIGGIO—Corse e gare aerenauticlie. Confer-enze con proiezioni sul l'Arte Fotografica Aerea.

enze con proiezioni sul l'Arte Fotogranca Aerea.
SERA—Esposizione su vasta scala di Fotografic Aeree e di apparati fotografici. (Sono invitati tutti i fotografi, professionisti e dilettanti, e fabbricanti di apparati fotografici.)

DOMENICA, 18MO GIORNO

POMERIGGIO E SERA-Conferenze Illustrate con proiezioni sull'Esplorazione Aerea e sull'uso di velivoli per le misurazioni costiere e geodetiche.

LUNEDI, 19MO GIORNO

POMERIGGIO-Conferenze sul bisogno di un miglior trattamente da parte delle Compagnie d'Assicurazione nelle condizioni di assicurazione delle macchine e degli aviatori,

maccinie e degli divatori,

SERA—Conferenze con proiezioni sull'influenza che i
sistemi del Corpo Medico dell'Esercito lianno
sulla diminuzione delle disgrazie. (Sono invitati
tuttigli agenti delle Compagnie di Assicurazione,)

MARTEDI, 20MO GIORNO

POMERIGGIO E SERA—Conferenze Illustrate in-dicanti i vari modi gi studiati per attraversare l'Atlantico nell'Aria—ostacoli da vincere, prob-lemi da risolvere per poter compiere felicemente il viaggio.

MERCOLEDI, 21MO GIORNO

POMERRIGIO-Giornata dedicata alla sicurezza Aerea—Discussioni su provvedimenti presi per la sicurezza Aerea—Perfezionamenti nella costruzione degli aereoplani; Aumentata sicurezza di motori aerei; congegni atti a migliorare la stahilità dei voli

SERA-Progressi fatti nell'arte dei piloti aviatori. (Illustrazioni.)

GIOVEDI, 22MO GIORNO

POMERIGGIO E SERA-Conferenze e discorsi di meteorologia; come possono essere fatte più esattamente le previsioni meterorologiche esplorando l'aria con velivoli negli strati superiori, e come queste previsioni meteorologiche possono essere utili alla nagivazione aerea-Fattori telegrafici e climatici in relazione all'Aereonautica.

VENERDI, 23MO GIORNO

POMERIGGIO E SERA-Conferenze sulla giurisprudenza aerea; leggi e regolamenti per il traffico Aereo. (Avvocati, Commissario di traffico, Au-torita di Polizia dei differenti paesi invitati.)

SABATO, 24MO GIORNO

POMERIGGIO E SERA—Corse e gare—Conferenze illustrate sul bisogno di stabilire un livello di altezza per il traffico aereo internazionale, interstatale, e interurbano,

DOMENICA, 25MO GIORNO

POMERIGGIO E SERA-Giornata d'Arta Aeronau-tica, Conferenze sulla Pittura e sulla Scultura di ogni paese su soggetti d'Aereonautica. Espo-sizione di quadri di soggetto dei tenenti Farre. Ruttan, e di altri. (Sono invitati tutti i più Valenti artisti, i direttori di Gallerie d'Arte e gli amatori d'Arte.)

SETTIMANA DEDICATA ALLA "MECCANICA"

LUNEDI, 26MO GIORNO

POMERIGGIO-Problemi di meccanica aeronautica e la loro probabile soluzione. SERA-Apertura di un concorso-disegni ed idee per

la costruzione di grandi aeroplani, MARTEDI, 27MO GIORNO

POMERIGGIO—Fattori che possono aumentare l'efficienza di grandi dirigibili. SERA—Vantaggi del legno compensato per la costruzione di velivoli.

MERCOLEDI, 28MO GIORNO POMERIGGIO-Conferenze sui problemi che si affacciano per voli a 25,000 piedi a piu e la loro probabile soluzione, SERA-Macchine aere d'oggi.

GIOVEDI, 29MO GIORNO

POMERIGGIO-Battelli volanti contro Idroplani per Sport e per trasporti commerciali.

SERA-Gare-Disegni ed idee per aeroplani di grandi dimensioni

VENERDI, 30MO GIORNO (Giorno Commemorativo)

POMERIGGIO-Corse Dirigibili-Gare di velocita d'ascensione tra palloni frenati—Gara paracadute.
SERA—Grande ricevimento nella Aereonautic Hall. Steel Pier.

SABATO, 31MO GIORNO

POMERIGGIO-Gare tra idroplani, aereoplani dirigibili-Gara Aviette alla quale interveranno tutti i ciclisti ed i fabbricanti di biciclette e di motoci-

SERA—Sistemi e regolamentari medici internazionali per aviatori in guerro ed in pace. Relazioni sui sistemi adottati nei differenti paesi, illustrate da interessanti projezioni, (Sono invitati 50.000 Sanitari.

DOMENICA, 32MO GIORNO POMERIGGIO E SERA—Distribuzione generale dei diplomi.

Il Governo d'Italia e le organizzazioni italiane di Aeronautica di Sport e di Scienze sono invitati a mandare rap-presentanti oda assistere a questo grande evento accentantico, Arrivando negli Stati Uniti i Signori Rap-presentanti dovamno presentanti al Quartiere Generale del Samitalo al N. 20 Madison Aree, N. y., per registrare e ricevere la tarophetta afficiale, mandre il programma. Nel caso fasso per loro più convenente recensi direttamente ad Atlantic City, potranno registrarsi colà presso gli

the case force per convenient eccars directament of attentic city, bottoms registrars cold perso of the stand in a separal adherent Hotel Temporer, Hard Challonte, The Force Hotel (1914) is the stand in a separal adherent Hotel Temporer, Hard Challonte, The Force Hotel (1914) is the Hotel (1914) in the Hotel (1914) is the Hotel (1914) in the Hotel (1914) is the Hotel (1914) in the Hotel (1914) in the Hotel (1914) is the Hotel (1914) in the Ho

nautic Hall, all'Esposizione sullo Steel Pier, nel recinto occupato dai giudici durante la gara, all'Aerodromo, all stazione degli idrop'ani dove saranno esibiti i velivoli ed i motori.

Ogni comunicazione sino al primo Marzo dovrá essere indirizzata al Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, N. 297 Madison Ave.. New York.

THE LIBERTY MAGNETO

PRIOR to the entry of the United States into the War, comparatively little constructive work had really been accomplished in this country in develop-ing a magneto suitable for the high speed, multi-cylinder engines required for aircraft service.

One of the first and most important one or the first and most important problems confronting the designers of the "Liberty" engine was to provide a depend-able and entirely satisfactory system of ignition. While practically all engineers were agreed that a suitable magneto af-forded the most desirable source for the ideal ignition system, current history and the result of the tests of magnetos sub-mitted clearly indicated that so far no magneto was available that could be read-ily mounted on and would successfully meet the exacting requirements of the twelve cylinder "Liberty" engine, therefore the battery-generator system of ignition was reluctantly adopted.

It remained for the engineers of the Berkshire Magneto Company to finally solve the problem with a very unique de-velopment of their high tension, inductor type magneto, so designed that it was me-chanically interchangeable with the distributor heads of the original system.

The service tests to which these spe-cial magnetos have been subjected since last November prove that they not only function perfectly, but start the engine easier, appreciably increase the horse power and efficiency, reduce vibration and

eliminate the many well recognized, in-herent limitations of the generator-battery system

In appearance the Liberty magneto more nearly resembles a small fractional horse power motor, as it is cylindrical in form, 0%" in diameter, 7¾" long and weighs

less then seventeen pounds.

Briefly described, it consists of a cylindrical aluminum frame within which is mounted an aluminum field casting with four sets of laminated steel inserts for pole pieces.

The four poles of the field are not conentionally arranged as in standard practice, but are located alternately 671/2 and 1121/2 degrees from each other to coordinate with the augular spacing of the engine. This arrangement allocates each spark in the most efficient part of the generated wave.

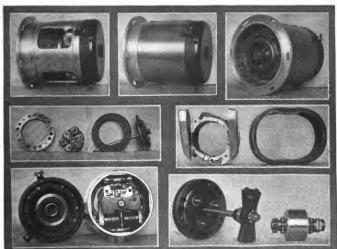
Attached to and on opposite sides of the field casting are two nearly semi-circular tungsten steel magnets, the ends of which abut each other in the center of one pair of pole shoes.

The stationary coil, which is supported by two projections from one set of field poles, is assembled on a laminated core on which the primary and secondary coils of enamel insulated wire are wound. The entire unit being thoroughly impregnated, after final assembly, with a special com-

pound applied in a vacuum. A two pole armature, arranged for four sparks per revolution, built up of steel punchings and assembled on a hollow shaft, is carried on two

very substantial ball learning, one of which is ready makes the the open of several ready and the several ready and administration to the open is present of the several several several several several several ready and the several ready as several ready.

ierropter, condenser, coil and other vital paints of the useful accessible for inspection. The driving power from the cam shall of the manufacture of the condense of the cond



The Liberty Magneta manufactured by the Berkshire Magneta Co.

THE O. E. C. TYPE B SINGLE SEATER

All IUU III the Meds - "P" and "C" May now the ret be form ongle searer types of the produced by the Ordanace Engineering Comparison of Ballesin, L. i., and the Model in the United States and street with a 150 H.T. Groune, it at grantlying to learn that it is first formance of the best off the then exasting for comparises. The Model "P" is a magic restore comparison. The Model "P" is a magic restore comparison. The Model "P" is a magic restore the comparison of the product of the product of the comparison of th

Receil gaus, somented on the warge or one system to be propelled.

After the executions of the meter, the form the propelled of the meter. When the propelled of the meter, the form the propelled of the meter of the form the propelled of the meter. The form the condition of the meter of the form the

hours. As stated before, the type "C" is an adaptation of the Model "B" fighter, and with the exception that the staggers differ in the two types and the tanks and weight distributions are different, the general dimensions of the two types remain the same.

Span, upper	plane.						26"
Span, lower p	lane .						23"
Chord, upper	plane.						4"
Gap, between	plane	s.,					3,
Overall length							.19
Overall beight	(prop	pell	ler	hor	izontal)	7"
Stonger							

			Leg. [1]
Upper plane			. 102.2
Lower plane			. 77.8
Ailerons, upper	plane		. 17.9
Total wing area	(with aileron	1)	180.
Stabilizer			. 12.2
Elevators			. 12.
Fin			. 3.08
Rudder			5 4
	Weights		
		(Pounds) Model B	Model C

Total weight, full load 1,290. Weight per sq. ft. of Area. 7.15

Weight		P	0	ť	1	ĸ	ŀ	۰	1	×	2	•	į	I	٠	F	٠	•	•							8	3.	0	7			1	13.
	W	74	ď	•	t	1		۰,		1	1		1	u	a		1	,	0		d	+		,	4	0	d	le	ė	C	2		
Fuselog																																	
Chassis																			٠.	i,							٠		·				
Tail Gr	01	ú	ė		ì																	÷											
Engine			٠					٠																			٠						- 2
Propelle	rr		,											٠.																			
Tanks															٠			,		,			,										
Wines									ı,									ı											ı	ı		٠	- 1



Waight Distribution (% of totals) Model B Model C 33. 34.4 28.3 34.79 15.5 12.65 23.2 18.16 Performancea

(Climb) Altitude (feet) 5,000 10,000 10,000 20,000 Time (minutes) Model B Model C 3.2

Clear vision is obtained forward through an angle of 45 degrees between wings. The only blind spots are through an angle of 8 degrees for the top wing and 33 degrees for bottom witte.

Ailerons are 6' 9" lung and 1' 7" deep. Center of pressure, 9' 6½" to longitudinal axis.

Tail Group

Stabilizer span, 7' 6"; depth, 1' 10". Center of pressure to center of gravity of machine, 11' 10".

11' 10". Elevators are 8' 2" in span; depth, 2' 0". Center of pressure to center of gravity of machine, 13' 4". Bigh and 2' 0" deep. Center of pressure to center of gravity of machine, 13' 4". Fin. 1' 8" high, 2' 10" deep. Center of pressure to center of gravity of machine, 11' 9".

Landing Chaesis Wheels have a track of 5' 0". Angle of center of gravity ground point and vertical 13% degrees.



Rear view of the O. E. C. Type B Gnome Engine Scout

Altitude (feet)											(:	S	P	e	e	d)				(M	li	le	a s	er l	Hour)
										ı							ı	ı		ı	-1	Ġ	16		-	104
5,000																						í				101
10,000	٠.								ı										ı			,				96
15,000						ı			i	i			i			ì			i	ì			÷			90
20,000			ì			ì	÷		i	ï	ì			÷		ì	ì		ì	i		ì	i.			83
Ceiling		÷				ï			ì				i	ï			ï	i	i	ì		i				7.2
Stalling	S	b	c	ri						ì							î		ì	1		4	i			33
									ñ		D	h	iè	'n	t	ú	×	'n	ŕ							
	3	d.	8:	u	211	n	10	n		r	a	11	g	e	,	ā	1		1	0	00,00	0	1	ee	· w.	del C
At full	pi	2	r	r																						bours
At min	'n	111	m			ú	.,	۰		r															1	hours

Aspect ratio of upper wings, 6.5; lower wings, 6.14.

Aspect ratio of upper wings, 6.5; lower wings, 6.14.

Safety factor of wing truss at high upced, 6: at a constant of the constant of the

Chansis designed to stand up when fully loaded machine is dropped from a height of 10 inches.

Fuselage

of 10.

The instruments on the dashboard are as fol-lows: Dixie Magneto switch; Phinney-Walker-rum wind clock; longitudinal inclinancetry and first the property of the state of the state of the state character, Signal Corps, type B; pool of the Air Speed Indicator. The clock, Altimeter, Ta-chometer, and Air Speed Indicator have Radio-lite dials.

A Pyrene fire extinguisher is conveniently mounted at the left of the seat, connected so as to be pumped directly into carburetor, or it may be used separately.

Power Plant (LE RHONE)

The 80 H.P. Le Rhone engine develops its rated H.P. at 1,200 r.p.m. Fuel tanks are mounted between the engine and the pilot, over the center of gravity.

Capacity of gasoline tank, 18 gallona, Oil, 4 gallona. Weight of gasoline, 110 lbs., sufficient for 24 hours. Weight of oil, 28 hou, sufficient for 24 hours. Gasoline consumption, 0.60 pounds per B.H.P. hour. Oil, 0.13 pounds.

Propeller, 8' 4\%" diameter and 7' 6\%" in mitch.

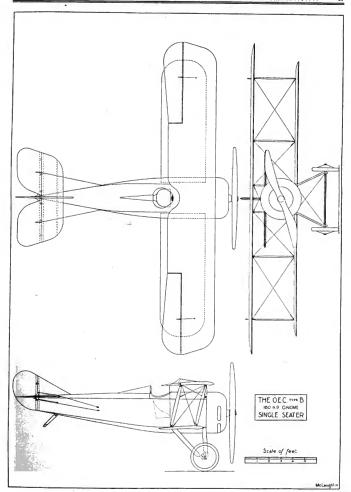
Height of propeller axis above ground with machine in flying position, 4' 11"; with machine at rest, 5' 6".

Power Plant (GNOME)

The Gnome engine is of French manufacture. At 1,200 r.p.m. it is rated at 160 H.P. Gasoline consumption, .85 pounds per H.P. per hour; Oil, 16 pounds per H.P. per hour; asoline capacity, 3 gallons; weight 210 pounds. Dil capacity, 4 gallons; weight, 28 pounds.



Three-quarter front view of the Ordnance Engineering Corporation's Scout



THE LAWRANCE 60 H.P. AIR COOLED ENGINE

THE Lawrance Model L-1 is a three-cylinder Y-type air-cooled engine rated at 60 h.p. at 1,900 r.p.m. The accompanying graph shows that the engine delivers 30 h.p. at 800 r.p.m. and 63 h.p. at 2,100 r.p.m.

at 600 r.p.m. and 63 hp, at 2,100 r.p.m.
Bore, 425 inches; stroke, 525 inches. Cylinder displacement, 225 cubic inches. The weight complete with propeller hub, 130 pounds. This weight includes everything necessary for running, with the exception of the oil tank and mounting plates for which an additional weight of nine pounds is allowed. Starting handle is supplied when desired. Exhaust pipes made to individual requirements.

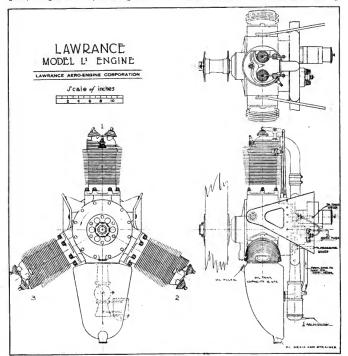
The cylinders are of cast aluminum with cooling fins ma-chined. Shelby steel liners with walls 1/16 inch thick are cylinder and the crankcase. Liners are case-hardened and ground, which gives them a very fine wearing surface.

Each cylinder is attached to the crankcase by means of six studs.

Pistons are of cast aluminium alloy. Crowns are flat. Each piston has four concentric cast iron rings and one wiper ring on skirt.

Cranktanaft is of chrome incicle-steel, It has a single throw and is counterbalanced. The shaft is hollow for labrication. Front end of shaft is stapered to receive the propeller hub which is drawn tight by means of a differential thread nut. The shaft is sturdy and of large dimensions throughout.

Connecting rods are of chrome nickel-steel. They are round, of constant section and hollowed for lightness. They are machined all over. Each of the three rods has a seg-



Diagrams of the Lawrance Aero Engine

Mechanical changes are then made and another test conducted and errors noted Our records show that the average instrument is tested twelve times before being finally passed, total test occupying on the average 21 hours with a total rest period of a working week. This is exclusive of of a working week. This is exclusive the time consumed in compensation.

Friction is a great source of error and as a consequence all bearing have to be very finely polished. Attention has to be given to the correct adjustment and perfect centering of all parts,

At one time it appeared as if production would stop entirely on account of the lack of the very small chains used to transmit the movement to the hand. These chains are all of European manufacture and great difficulty was being encountered in getting sufficient for our needs from our London factory. After considerable experimenting we succeeded in producing some ourselves in small quantities, but the day was saved when our foreign representative successfully procured enough for a further ninety thousand instruments.

Besides being used on altimeters these chains perform the same vital service on the barometers we were making at the



Single test unit of 60 instruments



High temperature test for compensation

There were two reasons why the French authorized the insugariation, during wer fines, of a thorized the insugariation, during wer fines, of an entire the contract the insugariation of the contract the contract that is a contract to the insufficiency and alow transfer of the contract to the insufficiency and alow transfer of the contract to the cont

The report further points out that if he is not extra-regard the avoitor will be able to retire with 18000 frames (£5,000) regals and that with 18000 frames (£5,000) regals and that the residual point of the form of the lines and so that the second of the lines are seen as the second of the lines and so that the letter is clear or in code. If owing to be the letter is clear or in code, If owing to be weather or log the mail does not leave, the two wireless, the other following by onlinary small; the letter is clear or in code. If online 1800 the letter is clear or in code, the violence of the letter is clear or in code, the violence of the letter is clear or in code, the violence of the letter of the following by onlinary small; to not the wireless, measure, but an accident or rough it will be known immobility; because according to the dark the pilot will be required uses. When the alleged time he passed and no will report a breakdown and will proceed to send will report a breakdown and will proceed to send

rate of twelve hundred weekly for the U. S. Navy and the U. S. Shipping Board, A successful attempt was made by us to supply similar instruments for the war needs of some Allied countries. Each instrument necessitated the use of a chain,

All completed altimeters were given to government inspectors to enable them to conduct separate tests and select those instruments which came up to specifications in every way. The instruments selected were then stored for a period of three weeks and at the end of that time another and final test was conducted by the government to ascertain if any changes had taken place due to settlement of parts, corrosion by moisture, porosity of diapliragms, etc. Accepted instruments were then ready for shipments to the various depots and plane manufacturers.

We may well feel proud of our attainments for the almost impossible has been successfully accomplished and except for a very negligible quantity the Tycos altimeter has been fitted to every U. S. machine, both for Army and Navy.

Flying high above the clouds, the Tycos altimeter has helped by doing its bit to make the world a better place to live in.

the mail by wireless. This does not seem a very workable plan, the author of the articles of the property of t

LUBRICATING OIL INVESTIGATION

R. S. W. STRATION, the Diversor of the Nursean of Standards, has requested Antala which has been reported as a guide to the proceed which has been reported as a guide to the proceed of a research on Intercasing oils, particularly and the proceeding of a research on Intercasing oils, particularly and the proceeding of a research on Intercasing oils, particularly and the proceeding of the

cial importance, to be advantage of it is in-dustries. The most careful consideration of it is in-tered and constructive criticisms and suggestions of the constructive criticisms and suggestions of the constructive criticisms. They should be sent to the Director, Bureau of Stand-ards, Washington, D. C. Following is the program:

ards, Washington, D. C.
Following is the program:

The general purpose of this investigation is to collect as much information as possible pertainable of the program and constructive the improvement of the program and constructive prepresent.

criticisms vi tily appreciated. General Statement So far as present knowledge goes the ideal lubricating oil abould possess the following charcteristics:

(a) Maximum reduction of friction.

(b) Minimum amount of wear of rubbing sur-

Maximum length of time that oil can be

(e) Maximum rengts of time that of this seed in service.
(d) Minimum rate and minimum amount of recease in lubricating efficiency.
(e) Minimum carbonization in combustion

decrease in nurrenting animates in combustion chambers.

(f) The greater accurring against science conchambers.

(f) The greater accurring against science contractions are all the properties of the science of the

range?

(4) What predictions may be made of the specific consumption of oil in an engine from the values of the flash, fire and boiling point range? Should the entire boiling point range or any part of the boiling point range of an oil be limited?

part of the boiling point range of an ail be list(5) What are the relative values of the Con-radean earlies residue test and the Waters or ing the decomposition, which will occur in any (6) Dees the presence of containing the decomposition which will occur in any (7) Dees the presence of containing products in an oil effect its lubrication deficiency in ser-cessor are caused by the use of containing the con-cessor are caused by the use of containing the con-cessor are caused by the use of containing the con-cessor are caused by the use of containing the con-taining of the containing discrete and thereof explained the containing discrete and thereof explained the containing the containing the con-taining of the containing the containing the con-taining the con-tain

mineral blended with castor (using oleic acid as a binder) or mineral blended with other fatty

a bader's or unsersa idented with overer any.

(9) Is it derails to blend first you likely be a supply with surrer alors and the surrer and t

to seaword changes in temperature, wear of engine parts, possularities of Divinciating years.

(1) What are the relative merits in service and engine parts, performent and maphisms performent.

(2) What are the relative merits in service and maphisms performent and the condition of the service of the service performent.

(3) Intervy Twelve Cylinder.

(4) Liberty Twelve Cylinder.

(5) Liberty Twelve Cylinder.

(6) Competent of the service of the service

(6) Condensate from breathers (a) Oil (b) Volatile (c) Gas.

Test Periods

It will be uccessary to determine whether the same amount of decomposition can be obtained in I bour runs as in 5 hour or longer periods. A standard test period will be chosen for all

n I hour runs as 10 3 hour or longer periods, the control of the control control of the control of the control control of the control of the

Theory of Labrication

Adherion
(1) Determination of method or methods of measuring adhesion on the following groups of

is:
(a) Hydro-carbon oils of different bases, and each of different viscosities and volatilities.
(b) Fatty oils—prime land, "seidles tallow, castor and sperm, also same with different proportions of oleic acid, cotton-seed, etc., also cutting oils.

(c) Blenda of hydro-carbon oils and fatty oils, also hydro-carbon and castor blends with oleic acid as a binder. Study of cutting oils, and the bearing cutting oil properties have on Unbrication. Power con-sumption for cutting operations with and without cutting oils.

oil properties have on ilubrication. Power con-sumptice for cutting operations with and without cutting oils.

Films

J. Behavior of films at constant temperature on plates also on plate with temperature gradient, to determine drianges and rate of operad.

The constance of the constance of the cut-ting of the constance of the con-ting of the constance of the con-ting of the control of the con-ting of the control of the con-trol the con-trol of the con-

ent Rhowwood Cation.
Thermal Properties
Specific Heat, Heat Conductivity and Thermal Expansion on same groups, of oils as given under Adhesion.
Friction Machines

6 febrion machines

Friction Machines
The practical underlines of friction machines in general has been writely commented upon and settle the real value of friction machines, the following program of investigation is proposed:
(2) The analysis of all existing machines, the following general items:
whether a realing can be made of the critical point of film breakdown, i.e., incipient seizure of bearing at machine company of the program of the surfaces.
(c) Method of regulating all operating condi-

(c) Nethod of regulating as operatory avera-id) Recording devices, automatic or otherwise, In the preparation of the above analysis it is formation as possible may be given in tablest form for direct comparison. I sand, then complete detail specifications should be prepared of an Ideal Friction Machine on which all determina-tions of the second of the second of the second property of the second of the second of the studying labricants will folly cooperate with ref-erence to bearing.

Routine Tests Fresh and Used Sample

1. Greenly,
2. Flash,
3. Five.
4. Viscosity, (Saybolt Universal) at 100°, 150°,
212° Fahr.
5. Color.
1. Freen

212° Fabr.
5. Color.
1. Fresh Heat Tost
5. Color.
1. Shaker—(Colea).
5. Shaker—(Colea).
5. Shaker—(Colea).
6. Emulzio.
6. Emulzio.
6. Shaker—(Shaker).
6. Shaker—(Shak

Special Laboratory Examination

Corbon Residue
Carbon residue valoes will be determined by
means of the Conradaou Carbon Residue apparatus as described in the A. S. T. M, proceedings. All outside oil samples and special engine
test oil samples will be subjected to the Conrad-

test oil samples will be subjected to the Conrad-son test. Oridonic South outside and those used in the special energie tests will be subjected to tests in hoth the Waters and Stratford oxidation oversa for the following determinations: (a) evaporation loss, (b) petroleum ether insolubles, (c) "var-nish"—resion.

long, (h) perceleum ether insolubles, (c) "sur-lin making, agental study of the susceptibility in making, agental study of the susceptibility should be given to constitution and methods of submitted the submitted study of the sub-mutation of the submitted study of the "susceptibility of the submitted study "susceptibility of the submitted study in a submitted study of the submitted study in a submitted study of the submitted study and submitted study of the submitted study and submitted study of the submitted study of the submitted study of the submitted study for the submitted study of the submitted stud

Sayboli, distillation method.

Polatility
Po

(a) Destructive distillation under atmospheric premure, (b) Dry distillation under bigh vacuum (40 to 0 millimeters Hg.).
(e) Distillation under high vacuum (40 to 50 illimeters Hg.) with the introduction of super-

millimeters IIg.) with the introduction of super-heard steam.

The production of super-heated steam.

It is proposed to determine by super-heated steam.

It is proposed to determine by super-inectation able to the study of the constituency of lubrical so gold with least decomposition of oil and with constituency of the study of the constituency of lubrical so gold with least decomposition of oil and with constituency of lubrical state of the study of the constituency of lubrical state of the s

List of Oil Samples for Examination

commercial Oil
A two callous sample of all available American
hardware-bro oils, intended for the labrication of
the callous and the callous callous and
their physical and chemical characteristics. This
list of oils will comprise all of those now sold
tribution and volume of sales. These oils will
not at present be run in the engine tests. It is
intervals, say, quarterly, and for retain a fourounce sample for reference from each of the samStepsial Oil.

Section Oil.

ples purcuascu.

Special Oili

The following Liberty Aero Engine Oil Types
will be procured and subjected to a complete
examination, including engine tests. Specifications for these oils will correspond to the limits
prescribed by Signal Corps Specification Number

Long Corps Specification Number

Porafin Base
(1) Lubricating oil made from parafin base crude petroleum (Penna.) of high boiling point range.
(2) Lubricating oil made from paraffin base petroleum (Penna) with low boiling point range.

petroteum (Fenna) with low boiling point range. Kaphthens Base
(1) Lubricating oil made from naphthene base ernde petroleum (Gulf Coast) of high boiling point range.
(2) Lubricating oil made from naphthene base petroleum (Gulf Coast) with low boiling point range.

range.

performent (Golf Coast) with the desiring point of Farly Of Blends of Farly Of

manufacture. Miscellaneous Oils Various special oils will be used in the study of the effect of processing methods, i.e., acid treatment, sulpho-compounds, etc. Also the effect of filtration to different colors.

(a) Prime lard, (b) sperm, (c) castor oil—cold pressed, (d) rape seed oil, (e) rape seed oil, blown, (f) cylinder stock—low old test highly filtered, (g) cylinder stock—strained low cold test unfiltered, (h) "parafilm" and (i) acid treated oils.

Reservation of Used Oils

It is proposed to make a study of commercial processes applied to the regeneration of used oils and to determine what is the best and cheapest means of converting used oils into good labricants. Also to determine the relative luthricating efficiency of regenerated oils as compared to that of the same oil in its fresh, numsed condition.

Problems Involved

rooters Imposterd

1. Removal of solids in suspension.

2. Separation (distillation) of very volatile products.

3. Separation (distillation) of light oils.

4. Removal of beavy oxidized compounds by treating with soda ash and blowing with steam.

eam. emoval of moisture. iltration—Fullers earth. llending filtered oil to required viscosity if

necessary. roposed Samples for Regeneration

. Used oils made from partim erudes—Penna.

J. Used oils made from partim erudes—Penna.

Mid-Continent.

J. Used oils made from antennediate crudes—
Mid-Continent.

J. Used oils made from California crudes.

J. Used oils made from California crudes.

J. Used oils made from Delifornia crudes.

J. Used oils made from believe of the delivery of the delivery oils.

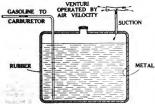
J. Wes oils consisting of a mixture of oils and when the delivery of the delivery

LEAK AND EXPLOSION-PROOF TANKS

Table acceptance for warface has been generally thought of an arcomanisment machine, but the first few weeks of the war demonstrated that it was also of great military value for both offensive and warface became a reality. The combination quickly realized has been acceptant to the property of the amenda at was not so much the pilot as the goodless took attended to the property of the amenda at the property of t

see fire to the machine and burned its occupants in midals. To counterst this, the Germans, having comparatively heavier places that the contrast having comparatively heavier places tanks, while the ingenious French engineers devised comparatives for tanks, in which one comparations (rough legistered and empired without places). The contrast is a game of wits and its moment had the enemy discovered the French methods than he erested and enapisery discondary bullets. These when mixed with the cargen of the air will spinle any explosive mixture with bulk it consent in centilet.

when marked with the chargem of the air will signife any explosive marker. These bullets were fired within a fraction of a second alternatively with armor piercing and tracer bullets, the order and number of each way to be a second alternative of each way consider the following under. The tracer bullet, leaving a fine trail of another, noted the guiners aim. The armor piercing bullet put signified by the treendary projectly which followed. This method of the signified by the treendary projectly which followed. This method of The compartment task used by the French airmen was now of no avail, because if our compartment was set on first the other soon exploded another French invention which consisted in exveloping the guardiers which allowed the second of the consisted in exveloping the guardiers which there was an explosion took the consisted in exveloping the guardiers which may be a support to the size of the publish, cases that the consisted of the visions character of these bullets, cases that the consisted of the publish, cases that the properties of the visions character of these bullets, cases that the properties of the visions character of these bullets, cases that the properties of the visions character of these bullets, cases that the properties of the visions character of these bullets, cases that the properties of the visions character of these bullets, cases that the properties of the visions character of these bullets of reviews the consistency of the visions character of these bullets of the visions character of the visions character of these bullets of the visions character of these bullets of the visions character of these bullets of the visions character of the visions character of the visions character of the visions character of the visions char



Cross sectional diagram of the leak and explosion-proof guantine

and the rechlems were immediately taken up by the Bureau of Stand-Detrest automobile capiner, Fred Weinberg, who had invested the nev least and explosine proof take; and it was demonstrated to the Washing-tean and explosing proof take; and it was demonstrated to the Washing-tean and the standard of the standard of the washing to The value of the investion was immediately recognized by the Bureau and the Advisory Consultive on Aeronautics, who in turn re-lative to the standard of the Science and Research Division of the survey of Standards and the Science and Research Division of the survey of Standards and the Science and Research Division of the survey of Standards and the Science and Research Division of the survey of Standards and the Science and Research Division of the survey of Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the survey of the Standards and the Science and Research Division of the Standards and the Science and Research Division of the Standards and the Science and Research Division of the Standards and the Science and Research Division of the Standards and the Science and Research Division of the Standards and the Science and Research Division of the Standards and the Science and Research Division of the Standards and Research Division of th

commended if to the Army and Nayy. Through the cooperation of the War Department the inventor was seen brought to a state of high Part Programment the inventor was seen brought to a state of high Part Department the inventor was seen brought to a state of high Part Department of the Weisberg tank in clearly illustrated in the diagram. Primaryly it is an originary ment land of any size or shape provide a partial vacuum thore the liquid undicinst to prevent its essage against the presence of autosphere on the extensive first and be second means of a venture in the draft of air white the exceptace is in flight, overcoming the excume created through the former. This may be experiently gard or was type negative to the travelous the state of the partial vacuum through the former. This may be experiently gard or was type negative to the travelous flight of the partial vacuum through the former. This may be experiently gard or was type negative to the travelous flight of the partial vacuum through the former. This may be experiently gard or was type negative to the travelous flight of the partial vacuum through the former. The covering, due to send leaves a bod to small that it can hardly be detected. The task may be a supplied to the partial vacuum through the flight of the partial vacuum through the flight was the partial vacuum through the flight distribution of the provide a accord opening such as we are accusabled to the partial vacuum through the flight of the variety of the liquid out with the best in a heart of the partial vacuum shore the flight regardless of how many halos the considerable variety of this is to pear the liquid count with best in a heart considerable value of the liquid of the word to the other. It follows that If we consider the provider a accound provider of the provider a second opening such as we are accusable with the partial vacuum through the belief of the variety of the partial vacuum above the flight regardless of how many halos the control partial vacuum above the flight regardless o

the bullet of this we uneven a worst against the specimes more of the bullet of the bu and escape

and exage, teen even made at the virilion representation in McCook Field, Dayton, Ohio, in the following manner. Two fidentical tanks, the made according to Weinberg invention, the other covered with shadel Department, were shot at side by and with armse privacy and insensities Department, were shot at side by and with armse privacy and insensities the Weinberg tank was presentantly by fits all owns prevents him which the Weinberg tank was preventantly by fits all owns prevents him which were followed by seven incending by bullets, and ordered into are explained

NOTES ON GERMAN DESIGN AND CONSTRUCTION*

By E. BOUDOT, Aeronautical Engineer

THE following notes are intended to give a succinct but precise and—as far as possible—complete idea of the methods of design and construction adopted in Germany. Many ways of reaching that object may be found. The one we propose to follow is to confine our analysis to only one machine at a time, to give all available information about the general and detail design, and illustrate it by and detail design, and intustice it of dimensioned drawings, for which we are greatly indebted to our contemporary *Paerophile* and to the authorities of this country, who have opened a most interesting exhibition of German aeroplanes and engines.

The Albatros Aeroplanes

The most pre-eminent and probably the best designed German aeroplanes are those produced by the Albatros Flugzeugwerke Gesellschaft, of Johannistal.

The Albatros aeroplanes may be ranged

into two classes.

1. The single-seater fighting biplanes. used only for fighting purposes. They carry two guns fring through the propeller elise and a variable load of ammunition. Their identification mark is D, which letter is followed by a number, giving the number of the design. Thus the single-scaters are marked D 1, D 11,

D III.

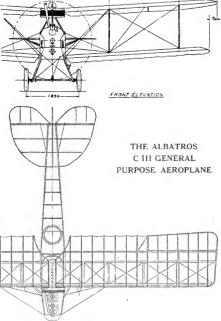
2. The two-seater biplanes, "reconnais-sance" type, used principally for reconnaissance work, artillery spotting, and photographic work. They carry two guns, photographic work. They carry two cann, cut fixed, firing through the propeller arry two cann, cut fixed, fixing through the propeller arrives are consistent as mounted on the usual circular guntered. They are identified by the letter C. Thus we find C. I. C. H. C

Albatrosi C III

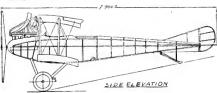
General Characteristics - "General purpose" aeroplane. Two-scaler, pilot in front, observer at the rear.
Six-yinder vertical engine, 170 bp Mercedes Six-crimder vertical engine, 170 b p Mercedes vaster-cooled. Overall span: top plane, 11.75 m. = 36.8 ft; bottom plane, 11.75 m. = 36.8 ft; bottom plane, 11.10 m. = 36.7 ft. Chird top plane, 1.800 m. = 5.91 ft., buttom plane, 1.700 m = 5.6 ft. Chird top plane, 1.800 m. = 5.91 ft., buttom plane, 1.700 m = 5.6 ft. Chird top plane, 1.700 m = 5.0 ft. Chird top plane,

Wing area: top, 19.75 sq. m. (including alterons) = 214 sq. ft. bottom, 17.75 sq. m. 193 Fotal wing area. 37.50 sq. m = 407 sq. ft

* Coursesy of Acronautics.



2 475 4



Control aurfaces; aiteront (top plane only), 1.0 sp. m. = 3.25 sq. ft.; clevators, 1.3 sq. m. = 14.1 sq. m. = 14.1 sq. m. = 14.5 sq. ft.; clevators, 1.3 sq. m. = 14.5 sq. ft.; Subdiving, seriese: faced air, laber, 3.0 sq. m. = 3.4 sq. ft.; fm. 5 sq. m. = 5.4 sq. ft. sq. m. = 5.4 sq. ft. yellow (weight (export) ** 80 kg. = 1.1 kg.) line. Total weight: 1.26 kg. = 2.7 vol. line. Wine [bodings: 3.37 kg. per q. m. = 6.9 line property looking: 7.45 kg. per h.p. = 16.4 line.

per h p.

Aerodynamic Qualities

Aerodynamic Qualities

Probably the most characteristic feature of this machine is the wing section used. Instead of sung a low cambered section usually found on modern machines and very efficient, the Albatros designer has used a form of zerofoli very amiliar to The Teason for this choice must be found in the rather high wing loading for this type of machine. High wing loading for this type of machine.

AIRCRAFT WIRES AND CONNECTIONS

In all aeroplanes the question of wires and the terminal connections associated therewith is a matter of some importance, and there is little doubt that the efficiency of modern wiring systems is largely responsible for the structural efficiency of the aeroplane as a whole.

Aeroplane construction consists almost exclusively of a framework of wood braced by wires, a condition of hings which has obtained since a condition of hings which has obtained since tengravings, of Henson's projected monoplane of 1842. This machine incorporated monoplane of the project of

The various wires used in construction may be classified into four distinct types; the solid wire classified into four distinct types; the solid wire characteristic for the control of th

without fracture of the wire. For this reason pinnowire gradually gave pince to a nofeer grade of wire which, while being to a nofeer grade of wire which, while being be made with a lessented danger of fracture. The criginal connection used for the pinnower sity exp, the free each being turned road a ferrule of notice opport tale, this being sometimes wared by exp, the free and being turned road a ferrule of a continue of the pinnower sity of the continue of

aboulders, not the irre out turned sex. Tests understood in the anaect of the American the instance of the American the instance of the American tests of the Americ

The gradual increase in engine power and tal weight of aeroplanes, led to the adoption of

stranded cable for all important loaded wires, this being made in two distinct ways.

The cable employed for inter-plane bracing is composed of a number of fine wires, varying from nineteen to thirty-seven, according to the differ ent diameters, the end section being indicated by

Where extra flexibility is required, such as for control wires running round pulleys, the cable is composed of a number of straints, generally seven, which in turn consist of a number of fine wires, usually nineteen, the end section being shown by Fig. 5.

English practice designates this form of cable a extra flexible, and the single rope of nineteen ires as straining cord.

American Casafordini is prociedly the re-verse, in that the imple rope is known as stranded able, and the multi strand as cord. Although the control of the stranding of the stranding of the not entirely govern the selection of a wire, as together the stranding of the stranding of the tages train, influence greatly the efficiency of a stay under active service conditions. Under tent breaking weight, the next best breight is might rope. It must be understood that in light a wire which must have a deleterious effect on the mate-rial, and for this reason a flaw or slight fracture failure in the arr, whereas the calle, by the on stranding of the damaged wires, would give warn-

Chiefly owing to the difficulty of forming a sat-isfactory splice in the single-strand cable, modern practice inclines toward the use of the multi-strand cable for all purposes, as the construction of this wire lends itself to the forming of a suc-

The earliest form of terminal connection for stranded cable consisted of a loop, the free end heng bound to the main part of the wire and heng bound to the main part of the wire and the property of the prop

inch. This renth, foundering the elementary faiture feller of corresion due to acid and solder in a secondary district, quantity, moreover, the anisobre is a secondary district, quantity, moreover, the anisobrem, which is one time schieved some population of the control of th

cent.

In the method indicated by Fig. 7 a piece of flat copper tube is passed over the wire, the free end of the latter being heat round a brass thimble, and then passed through the copper tube, in a similar manner to the connection for the solid wire in Fig. 1. The tube is then given several

system is reliable, and has given good resulta. turns, and the complete joint well soldered. This

system is reliable, and has given good resolu-tions, and ne compete point well soldered. This A distinctive terminal is indicated by Fig. 8, to a commodate the two this horsess of wire. The control of the control of the control of the control of the te operation of sevening at loth tome take forces the sevening the control of the control of the sevening that the control of the control of the all been extensively used, they have now given general proposition, in undoubtrying the herier ter-minal consection, in undoubtrying the herier ter-minal consection. The brass thimber property and terminal the control of the solid of the control of the solid of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the con-trol of the control of the con-trol of the control o

Diam. Strength of Strength of Material cter Material Wire, solid...... 3/16" 5,500 lbs. Strand, single... 3/16" 4,000 lbs. 7x19 multistrand... 3/16" 4,200 lbs. Stay 5,100 lbs. 4,100 lbs. 3,500 lbs

Albungh in the quest for increased speed the mum, the aggirgate rensuance still remained constraint, this aggirgate rensuance still remained constraint, this aggirgate rensuance still remained constraint, this aggirgate rensuance still remained constraint, the aggirgate rensuance still remained as a generally ascribed to the Royal Aurestal Fase in generally ascribed to the Royal Aurestal Fase in the still remained in a decision of the still remained in t

of int connection obstrates the use of introducities. They have been variously criticated as being exposure to produce, that the reasone may be produced to produce, the their reasone may be an and also that any fracture of fire it less liable fight. In manufacture the hold red is relief to the extens about by Fig. 10, a certain length light. In manufacture the hold red is relief to the extens about by Fig. 10, a certain length whereast. They of the connections mostly used are the extens about the production of the connections mostly used are the points of or manufacture. In the prevent were at the point of or manufacture, in the points of or manufacture, in the points of or manufacture, in the points of or manufacture and in the points of or manufacture and in the points of or manufacture and the points of or manu

Some years ago various attempts were made, mostly on French monoplanes, to utilize flat steel ribbon for exposed writing, but, owing to the difficulty of successfully forming a terminal, its use never became extensive, although it may possibly be regarded as the precursor of the modern streamline wire.

streamme wire.

It is notable that, so far, the wiring of all German acroplanes is effected by ealide, so that apparently the meris of the streamment of the parently the meris of the streamment of the streammen

Although determined attempts have been made of late to entirely cluminate exposed wiring, examples of this occurring in the recent German Fooker triplane, it appears that the various alterations engendered by this procedure in the structure of the machine more than counteract the saving in bead resistance.

Moreover, with modern methods of construc-tion, the ultimate strength of a wireless wing structure leaves considerable room for improv-ment, and the price paid for the saving is too great.

The arrival of the all-steel aeroplane would en-tirely alter the condition of things, as with this construction much better chances exist for the production of a reasonably strong wing structure, without exposed wire bracing.



Figures 1 to 12-Types of wire and cable terminals. Figures 13 and 14-Clips to prevent vibration and friction where cables cross one another



NAVAL and MILITAD AERONAUTICS



Key to Abbreviations

Report to Army Balloon School, Areadia, Cal.
Report to Aviation Supply Depot, Garden City, L. L., N.
Report to Aviation General Supply
Depot, Morrisco, Va.
Report to Aviation Supply Depot, Richto Aviation Supply Depot, Rich-Va. to Barron Field, Fort Worth, Director of Aircraft Pro-Juna—report to Director of Military Aeromonitor, Washington, D. C.
EOT—Report to Ellington Field, Olcott, Texas,
FSB—Report to Fort Omaha Balloon School,
FSO—Koraba, Neb.
Sill School for Aerial
GLC—Report to Geratner Field, Lake Charles,
HUM Jan. Aere- WDM

the number of the field is given in the number of tha field is given in parentheses, Field, Dallas, Tex. Report to Love Field, Dallas, Tex. Report to Render, Field, Hampton, Va. Report to McCook Field, Dayton, Ohio. Report to U. S. Nava Air Station, Mismi, Fla. Report to Fost Field, Millington, Tenn. Report to Park Field, Millington, Tenn.

Report to Payne Field, West Point, Miss. leport to Rockwell Field, San Diego, Cal.

cs.)
Taylor Field, Mootgomery, UTA-Director of Military Aeronaurrival. Vilbur Wright Field, Fair-

Note i-Report to places mentioned in order GLC—Report to Fascheurs Field, Lake Charles,
L. I., N. Y.
KST—Report to Kelly Field, San Antonio,
T.C.
KST—Report to Kelly Field, San Antonio,
Note 2—Report to Middletown, Pa., to supTex. (When specified in the order, 1) deport.

Not. 4—Report to Wright Martin Aircraft Cry. Long Island K. Y. Note 5—Report to Technical Section, Day-ton, Qhio.

Note 5—Report to 25 South Main Street, Dayton, Obio.
Note 7—Report to Little Bullding, Boyiston and Tremont streets, Boston, Mass, and wire Note 5—Report to 506 Madion Avenue, New York City, to district manager aircraft fnance.
Note 5—Report to General Hoppital No. 32, Note 5—Report to General Hoppital No. 24.

Nor 9 — Report to General Hospital No. 32, Chicago, Ill.
Note 10 — Report to Fort Crook. Nebrasica, Note 11 — Report to Lette Rock, Arkanas, to commanding officer.
Note 11 — Report to Little Rock, Arkanas, to commanding officer.
Panasan. Canal Zone, Arcon, Panasan, Canal Zone, Arcon, Panasan, Fraces Field, Coco Walk.
Note 13 — Report to Indianapoils, Indiana, and wire DM. Descort to Gedman Field. Camp

and wire DMA.

Note 14—Report to Godman Field, Camp
Knox, Stithton, Ky.

Note 15—Report to 2050 Elmwood Avenue,
Buffalo, N. Y.

Note 15—Report to 2050 Elmwood Avenue, Bullaio, N. Y.

Note 16—Report to Aviation Geoeral Supply
Depot, San Antonio, Texas.

Note 17—Report to General Hospital No.
21, Denver, Colo.

Note 18—Report to Los Angeles, Cal., for

Note 20—Report to Gas Plant No. 3, Petrolia, Texas. Note 20—Report to General Eastern Department, N. Y.

Special Orders Nos. 41 to 40, Inclusive
Andrews, Roger W
Adams, James E
Brann, Milton F
Beattie, Harold GBOT
Bleakley, Wayne WDAP
Berger, George R. B
Browne, William O
Browne, William O. DMA Baldinger, Ora M. DMA Brown, Herbert S. LHV Bogardus, Arthur G. MDO
Bailey, William M
Clark, Joho M
Conover, Harvey
Clark, Joho M. BFI Copie, Arthur J. PFO Conveer, Harvey Note 9 Campbell, Douglas JMA Coanst, William M., Jr. DAP Caldwell, Ralph C. DMA Chapman, Carleton G. Note 13
Chapman, Carleton GNote 13
Douglas, David Dwight LHV Dunlap, John R CGC
Donaldson, John U Note 12
Carrow, Arthur M
Doust, Horace Tyner
Erwin, William P
Fairchild, Muir SEOT
Fairchild, Muir S
George, Harold H
Gerlach, Fred L
Hooper, Harley L
Hartmao, Harrisoo J. SAG
Hall, James G. Note 7 Harper, Earle G. Note 7 Hyer, Benjamin B. VBW
Inglis, Henry BNote 5
Inguis, memy a

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	Jones, Aaron E	
	Johnson Walter SNote 8	
	Joyce, John NealNote 6	
	К	
	Kendrick, William J	
	Krapf, George WABC	
	Kendall, John DNote 12	
	Knight, Duersoe	
	Kendrick, William J. DMA Krapf, George W. ABC Kendall, John D. Note 12 Kendall, John D. DMA Knight, Duersoo DMA Keating, James A. JMA	
	Lawson, Norman L Loon, Charles S. LHV Lee, Bernard W. WFO Lee, Everett J. Net 8 Fehmann, Chester L. Note 10	
	Lawson, Norman	
	Lyon, Charles S WFO	
	Note 8	
	Lee, Everett J	
	Lange John Joseph Note 10	
	Lancer, John Joseph	
	Martin Frederick IDMA	
	McNeil, Guy LPFO	
	Macliwain, William H. PFO McNeil, Guy L. PFO Milyard, Raymond C. PFO	
	McRae, John DMA Miller, Clarence L Note 15	
	Miller, Clarence L	
	McCammon, Edward Eugene DAP	
	Nolan, Edward J	
	Noish, Edward J DMA: Note 19 Note 1	
•	Meville, Kaiph M	
	Owen, Thomas Henry	
i	P	
	Pierce, Hugh MBFT	
:	Pileher, Rufus LPFO	
	Pilcher, Rufus J	
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)	Rickenbacker, Edward V	
	Rice, Ward H	
Ε.	Ronao, Arthur Thomas	
r	Reynolds, John N	
	Robiosoo, Paul PNote 7	
7	S	
8	Stratton, Lyno L	
5	Stetson, John B., JrLHV	
2	Schwah, Emil F. LHV Sudlow, William B. EOT	
6	Sudlow, William BBOI	
•	Struthers, Parke H. LHV Saunders, Bradley J., Jr. LHV Spring, E. W. DMA	
,	Saunders, Bradley J., Jr	
3	Scholle, Howard ADMA	
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7	The second secon	
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•	Thach, Robert G	,
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318 Consecutive Loope Made By Lieut. May-nard in France

318 Censecutive Loope Made By Lieut, Maynard la France and la France a

Te Return Soon

The following organizations have been assigned to early convoy: 157th, 370th and 639th Aero Squadron-feeting reads:
On the transport Plettaburg, which sailed from Brest February 26 and is due to arrive at New York March 6:
"37th Aero Squadron, 9 officers, 168 men"

should read "49th Aero Squadron, 9 officers, 108 men."

The transport Patris sailed from Marseilles

March 2 and in due to arrive at New York about
March 14, with 34 casual officers of the Air

Service on board.

Over 4,800 Liberty-12 Engines Shipped to Storehouses Since Armistice

Sterehenest Since Arministes
The Statistic Branch of the Germal Steff,
The Statistic Branch of the Germal Steff,
table, which shows the number of pines and
quanton sloped by the discress of hydrest
despite the sterent sterent sterent sterent
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(DAS descentary training engines. 1264
DE Haviland 4 observation planes. 1264
DE Haviland 5 o

Honorably Discharged

The following officers of the Air Service have been honorably discharged: Lientenant-Colonel Robert Glendinning. Majora Charles H. Hammond and Frank H.

Fani F. Immel, Leo M. Harlow and Walter A. McDonald. Second Lientenants Robert G. Elbert, Robert H. Doutt, James A. Johnston, Jr., George D. Kingsland, Louis A. Giroux, Edward L. Bullock, Ir., Herbert J. Stack, James C. Hayes, Efford A Beverly, Anthony E. Nommensen, James W. Huntley and Norman C. Granniss.

New R. M. A.'s

The following officers have been rated as Reserve Military Aviators from the dates set after their respective names:
Major Ora M. Baldinger, A.S.A., January 30, Captain Gordon Baker, A.S.A., January 30.

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Admiral Sime Congratulates Naval Airmen Through Aere Club of America President Alan R. Hawley of the Aero Cinh of America recaived the following wireless message

Senator New Objects to Sale of Army Aircraft Equipment at Fraction of Cost

Members of the United States Senate Com-nittee on Military Affairs have revealed to the New York Swa an intention by the Secretary New York Swa an intention by the Secretary mantle the nation's air service, to hand over to a few ahreved dealers in the good graces of the Administration equipment at less than junk price and to make no provision whatever for used and to make no provision whatever for used to the provision whether the provision whether the other nations are now working night and day to develop.

and in make one provision whiterers not used other nations are now working night and day. The facts are so assumding as to be incredible were they not supported by the avoidence in the week they not supported by the avoidence in the open to doubt—Harry S. New of Indiana, James of the sub-committee on aviation of the sub-committee on aviation of the Military Affairs Committee these Senators have grathered which the support of the sub-committee on aviation of the Military Affairs Committee these Senators have grathered which the support of the sub-committee on aviation of the Military Affairs Committee these Senators have grathered which the support of the sub-committee on a support of the sub-committee on a support of the sub-committee of the Military and the support of the Military and the sub-committee of the sub-co

of 20,000 Liberty motors, on terms that conscientious manufacturers denounce as risiculous,
even scandisous,
private bidding, 2,000,000 feet
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price which would yield but a mail percentage
of the original cost.

S. To sell a trivate bidding 7,000,000 yards
of acroplane lines at terms equally disastrous
hidders. Evernments, however favorable to the

of aeroplane lines at terms equally disastrous that the contraction of the contraction of

Second Lieutenant George K. Pond, A.S.A., January 27, 1919. Second Lieutenant Arnold M. Kent, A.S.A., February 12, 1919.

Anti-Freezing Mixtures for Rediators The Motor Transport Branch, Supply Section, O.D.M.A., is in receipt of latest reports on anti-freezing mintures for radiators from the U.S. Barean of Standards. This information is on file in this branch and is available to any-conjunctions.

one interested.

General Mitchell Says, Planes Would Have Been Used to Transport Troops to German New York, N. Y.—Ping, General William Mitchell, who screed two years with the air Mitchell, who screed two years with the air to the Sective of Annousedur Engineers hed in the Engenering Secretis Blaiding, 20 Wort to Sective of Annousedur Engineers hed in the Engenering Secretis Blaiding, 20 Wort to Section of the Sective of Annousedur Engineers hed in the Engeneric Secretis Blaiding, 20 Wort to make the worth of the Germans sedom from the Company of the Section of the Sect

Air Service Units Returning

The battleship Lewissan sailed from Brest on March 5 and is due to arrive at Newport News on March 15, bearing, among other units, Balloon Wing Companies D. E. and P. The battleship South Carolina, due to strive at the same place and date, is returning with the 5 officers and 164 men of the 5th Air Park.

Clothes for ex-Soldiers Needed The reclamation shop of the National League for Woman's Service, 21 West Forty-sixth Street, is urging contributions of men's wearing appared of all kinds for discharged soldiers, stating that civilian clothers are necessary for them to obtain work. Clothes that cannot be delivered will be work, Cl

on March 5 from Vice-Admiral William S. Sima, commanding the Unitel States Navy in British

commanding the United States Navy in British waters: experient the saval visitors of America waters: experient to the saval visitors of America may meat mincre appreciation of their course groun and abread throughout the war. Their brilliant remain control of the saval water of the saval water of the saval water of the performance of duty of these yaung saval axistors under my commande has not provided the saval water of the sa

Aeroplanes and Engines Shipped to Storeho Since Date of Armistice

The following statement was prepared by the Statistica Branch, General Staff, War Depart-

Statistica Branch, General Staff, war Lespan-The following table shows the number of places, and engines altipated by the Borean of Aerceat, and the state of the state of the state of the class of the articles of the State of the Aerceat Liberty Leberty Exercise on Health of the Liberty Leberty Exercise of the State of the Liberty Leberty State of the State of the Liberty Leberty Leberty Leberty Leberty Leberty Leberty Liberty Leberty Leberty Leberty Leberty Leberty Leberty Leberty Liberty Leberty Leberty

Prisoner Taken Via Air, Indiana to Ohio

Prisoner Taken VIa Air, Indiana to Ohio Dayton, Ohio.—The Police Department of Dayton on February 26 set an unusual precedent in other when a pressor was driven by acroplane from Indianapolis to Dayton. charge of the delivery of the prisoner to Dayton, and at the end of the trip plan be believes the acroplane will trip that be believes the acroplane will try over in the safe delivery of prisoners for whose release there has been public against or against whom public reding run high.

New Board of Contract Review
Lieut. Col. Jacob E. Fickel, Capta. George W.
Price and Louis Montford bare been appointed
members of the Board of Contract Review of the
Division of Military Aeronautics, vice Gol. Harold Bennington and Capta. Ohis S. Van de Mark
and Lewis B. Ticknor, relieved.

Royal Air Force Mail Service Speedy

Royal Air Force Mail Service Speedy
London.—A fine letter carrying feat was carried
out by the Royal Air Force recently. The Air
Ministry received a document at 12.35 p.m., at
1 p.m. a special aeroplane left. Hendon, and the
letter was delivered by the airmen in Cologne
before dusk, The 300 miles was flown with one
stop near the French coast.



FOREIGN NEWS



Brussels, March 4—King Albert of Belguum went to Aia-la Chapelle on Sunday by aeroplane, visited the headquarters of the Belguin Army of occupation and flew back to Brussels. The trip was made in about 50 minutes each way. The King took care not to fly over Dutch terri-

Caproni Aerabus on Trial Flight

The Caproni ecrobus squedron, intended for the proposed passenger service between Naples and Rome, left Cento Celle at 11 o'clock several days ogo and errived at Noples et 12.10. The return flight started from Naples at 2 P. M. and was completed at 3.10.

Reyal Air Force to Have 6,500 Officers and 75,000 Men as Peace Standard

London — A reconvergent by the Control of the Contr

stripes.

A weekly homus has been added to the pay of all ranks, rauging from 10 shillings weekly for second class mechanics to over 2 pounds for officers ranking shove Lieutenant-Colonel.

British Radiophone Progress

British Radiophoan Progress.

Lordan—Art miniment ingunes of the Western Electric Company, who was ensured the green of the Western Electric Company, who was extended to the Western Company, who was extended to the Western Company of the Western Company, who is tening British Royal Air Robbs experienced to the Western Company of the Western C

British Metereological Department Operating Fifty Stations

British Metervelagical Department Operating Fifty Sations. Doubn.—It was recently amounted that the British Government in the Company of th

Progress of Australia-London Air Route

Prayress of Australia-London Air Routs
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purpose of establishing of Australian business and which committee of
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Chinese Government Buying Aero-Redio Apparatus

London.—The British Marconi Company is manufacturing two hun
dia circult radio sets for the Chinrse Government, according to
statement by Mr. Godfrey Isaaca, managing director of the company.

Parts Flying Boat to Attempt Transationtic Flight
London. In addition to the dirigible and Hendley Page transationne,
plane, the British Government, according to information recently received,
will try a Dorte dying beaut for the projected flight.

British Surpius Government Property Disposal Beard Appointed London—In connection with the disposal of surplus State property, and the Connection with the disposal of surplus State property, and the Connection with the disposal of surplus State property and the Connection with the Connection of the

Trans-capting Co. Will're y to Fly to Brail

Fars-capting Co. Will're y to Fly to Brail

Mediterranean and

make the return trip within twenty-four hours, will soon make a flight

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Loodon, March 6 — Grea British I signs a sign of the state of

her flight preserved a perfectly even heel.

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London Madrid struce is about to be started.

Gas Station for Aeroplana at Pnamma
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The Gissermor of San Province of Capatal Island,
Porcentr, for avaiting purposes, and he has ofting with Navy avaition officers, the commanding
officer of France Field, Cristobal, Canal Zone,
and complete arrangements for the exhabithment
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A German C.V. plone of the Aviatik type



ELEMENTARY AERONAUTICS

MODEL NOTES By John F. MSMahon

E-50 300

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB

B21 Ravenna Beulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB

8730 Ridge Seulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE
CLUB

CLUB
Bloomington. Indiana
BROADWAY MODEL AERO CLUB
BROADWAY MODEL AERO CLUB
TRIANGLE MODEL AERO CLUB
Baltimers. Md.
NEBRASKA MODEL AERO CLUB
LINCOLN, Nebraska

DENVER MODEL AERO CLUB 2520 Raleigh St., Denver, Colo. BUFFALO AERO SCIENCE CLUB a/o Christian Weyand, 48 Dodge St Buffalo, N. Y.

THE ILLINOIS MODEL AERO CLUB Roam 130, Auditorium Hotel, Chicago, Itt SCOUT MODEL AERO CLUB
4 Chamber of Cammerce Bio.
Indianapolis, Indiana

MILWAUKEE MODEL AERO CI UP

CONCORD MODEL AERO CLUB
4'6 Edward P. Warner, Cencerd, Masa.
MODEL AERO CLUB 0'0 XXFORD
CAPITOL MODEL AERO CLUB
125-28 M Street, N. W.
Washington, D. C.
CORRESPONDENCE MODEL AERO CLUB
3RO N. Main Street,
RAFRO CLUB TECHNICAL

AERO CLUB OF LANE TECHNICAL HIGH SCHOOL Sedgwick & Division Streets, Chicago, III.

Model Aeroplane Building as a Step to Aeronautical Engineering

THE writer has received many letters since starting the light aeroplane articles asking different questions as to why I don't make a monoplane instead of a hiplane.

The first question is answered by reason of the necessity of combining the most efficient aerodynamical wing section with the strongest construction. In the Ford motored machine I found the R.A.F. 6-wing section best for the machine because of the husky spars that this section allows. This concause of the husky spars that this section allows. This con-struction gives a factor of sately of 9 in the wings. I had while at the Aeronautical Show, I found in the government book of research that the U. S.A. curves had been retested and showed up better than the first reports had led to believe. they will be distributed by the end of May. From what I heard the U. S.A. curves will be used ex-tensively as the distance of the top camber from the bottom

camber is pretty liberal in all the sections, which allows deep

wing wpars

I am seriously considering using the U. S. A. No. 1 section in preference to the R. A. F. No. 3 as the L/O is much higher and the Ky as well. This curve will allow great speed with little Horsepower

That the light weight aeroplane has come to stay can be seen by any one who visited the show. The Gallaudet Company by any one who visited the show. The Gallaudet Company exhibited a small two-seater monoplane of unique design powered with two Indian motorcycle engines of approximately 18 H.P. each or a total of 50 H.P. The propellers, two in num-ber, mounted at the trailing edge of each wing just far enough apart to clear the body when rotating, were driven by a cleverly worked out shaft transmission. A clutch was also in use to allow one engine to keep working if the other failed.

Another interesting machine was exhibited by the Dayton Wright Company. This little "ship" took the eye of every young aviator at the show, the most interested being the Army and Navy pilots. This little machine was in direct contrast to



Model of the Continental KB-3T described below

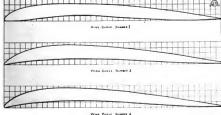
the big ones around it. Somehody remarked that the big Handley-Page would eat it, and it would not be noticed by anabody. The spread of this full machine was 18 feet. Too particularly the spread of this machine is about 90 miles an hour. These two machines the spread of this machine is about 90 miles an hour. These two machines the spread of the spre

horsepower, we cannot expect as much as the machines men-tioned above, but, we will be well satisfied to get a speed of or 70 M. P. H. I am negotiating with a machine shop at the present time

I am negotiating with a machine shop at the present time in regard to making the special crankcase to use with the motorcycle cylinder, and when everything is in working order! will their the readers who have been appropriated to the company of t

Coatinental K-B-3T Model

Continental K.13T Model
The model shown in the accompanying photograph is the work of a mechanical enzineer of the model o



Three U. S. A. Curves the data of which was given some time ago. The first, No. 1, we will use for our machine



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Rookie Speaks

Sitting at mess the other evening down at the Air Service Mechanics' School, one of the Fly-chasers happened among several newly arrived rookies,

several newly arrived rootes,
"Well," said one, "I do say that a ship can't come down tail
first." There was quite a bit of argument about this, but the
and portentous show of knowledge: "It's like this, Ielers.
You say a ship can't come down tail first. Well, how about
the tail spin? That's one of the most difficult stunts a flyer
has to do—bring his ship down tail first and spinning on the
tail."

And since no one apparently knew more about the subject, they let it go at that.

No Empty Chair

When Kaiser Bill wearily sits down in St. Helena or somewhere, and gathers his family around him and begins to figure out all he's lost, he'll have one consolation—he can gather all his family around him.

In Other Words-Good Old George Rober

They are silvery in color and in figure, They are streamline as regards the head and tail.

And in size they are considerably bigger Than a microbe, tho' they're smaller than a whale. They control themselves a great deal by their tailfins.

If they try to they can move like many beans, You will find them in great numbers packed in oil ties:

In other words-Sardines. They are frequently in use in aviation.

And are used by many members of that race. They are really quite important to the nation, And they travel through the air at breathless pace.

They provide us with good optical protection, And are guaranteed to be without defects, Thus permitting clear unlimited inspection; In other words-Eyetects.

Volplanetor

Insoluble In high air's Quiescency, My plane, on earth A sophist, naively Reconoitres promiscuously. Sinuously, nose retrousse, It spans thinning stratums Of atmosphere, and volplaning Deems itself a static medium. How it routes Pusillanimous planets From its path at night, Dazzling them Pyrotechnically With sovereign spectrums Belched forth sporadically. My purposelessness Prognosticates The heterogeneity Of world events. Nevertheless The sky's oscularity Propitiates My primal impulses And tedium is thwarted.

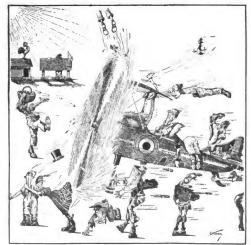
-Robert M. McAlmon.

That's It!

I quit Elsie! T'other day She wrote me. A fren of mine asked: 'Hoosit from?"

I seys:
"Mos' wonderful gurl livin'."
"Why, she's writin' me, too." He seys: Such fickleness.

I quit Elsie! -Ellington Field Tail-Spins.



The adventures of "Cyril" in the aviation world. He tests an engine



Vol. 9, No. 2

MARCH 24, 1919

10 CENTS A COPY



Climbing! A De H 4 in flight at Ellington Field.

Atlantic City Aerial Tournament to Last
Throughout Summer



WE find that no one really questions the superiority of AC Spark Plugs. In the automotive field, AC is the standard equipment of practically all the leading manufacturers with whom lower price is less significant than quality. When the United States

Government needed spark plugs for aircraft service, army engineers investigated all makes of spark plugs, then adopted AC as standard equipment for all Liberty and Hispano-Suiza airplane motors.

Champion Ignition Company, FLINT, Michigan U. S. Pat. No. 1, 185.727, April 13, 1915, U. S. Pat. No. 1,226,129, Feb. 13, 1917, Other Patents Pending



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VOL. IX

NEW YORK, MARCH 24, 1919

NO. 2

INTERCOLLEGIATE AERIAL TOURNAMENT AT AT-LANTIC CITY TO LAST THROUGHOUT THE SUMMER

To enable the hundreds of thousands of college men who were in the Army and Navy and Marine Corps. Service but have left the service, to continue their training in acronautics, both as a measure of hardinal preparedness and as a means of facilitating their remaining in the aeronautic movement, the Aero Club of America and the Aeronautic movement, the Aero Club of America and the Aeronautic movement, the Aero Club of America and the Aeronautic movement, the Aero Club of America and the Aeronautic movement, the Aero Club of America and the Aeronautic movement, the Aero Club of America and the Aeronautic movement, the Aero Club of America and the Aeronautic movements are also accompanied to the Aeronautic movements and the Aeronautic movements are also accompanied to the Aeronautic movements are also accompanied to the Aeronautic movements and the Aeronautic movements are also accompanied to the Aeronautic movements and the Aeronautic movements are also accompanied to the Aeronautic movements. League of America have arranged to hold a series of intercollegiate tournaments at Atlantic City during the coming

The first of these intercollegiate contests, which are to be held in May, are as follows:

Intercollegiate Seaplane Speed Race

Over a five mile course, for the \$2,000 Intercollegiate Trophy. This event is open to graduates and under-graduates whether in military or civilian life.

Dirigible Speed Contest (With Handicap) For the Aerial League of America Silver Trophy

This contest is open to Army, Navy, aero clubs, colleges and aeronautic organizations. It will be held on the afternoon of Saturday, May 3: Saturday, May 10; Saturday, May 17; Saturday, May 24; Friday, May 30, and Saturday, May 31.

Each member of the winning crew of each race will receive a silver plaque of the trophy.

The names of the members of the winning crew of each race will be inscribed on the trophy, which is to be competed for annually.

The race will be for the best speed (under the conditions of the handicap) made at each race.

After these events are over a few weeks will be allowed for preparation and then the following contests will be held:

Three Months Intercollegiate Seaplane Tournament

This will be an intercollegiate seaplane tournament to last three months. The contests will be held every Saturday, and the college holding the largest number of points at the end of the month, each month, will be considered the winner for that month. The second best the second; the third best the third.

But the final winner will be the college which has the largest number of points at the end of the three months.

Each college will be permitted to have three entries. The pilots may be changed weekly, the change being left entirely to the discretion of the college which has made the entry. This plan will permit the testing of a number of collegiae aviators and finding the best. It will also give an opportunity to a college, which may have had a very low number of points during the first and second months to catch up with the leader during the last month.

Three Months Intercollegiate Aeroplane Tournament

There will also be held a three Months Land Aeroplane Race, to be governed by the same rules as stated above,

Three Months Intercollegiate Dirigible Tournament

To provide for practice with dirigibles and give opportunities to college men to participate in the development of this wonderful and most progressive branch of aeronautics, there will also be held a Three Months Intercollegiate Dirigible Tournament, to be governed by the same rules as stated above.

The Aero Club of America and Aerial League of America The Aero Club of America and Aerial League of America authorities have been assured that the Army and Navy will be glad to co-operate and permit Army and Navy officers who are dirigible balloon pilots to represent their respective colleges in the dirigible balloon tournament.

Three Months Intercollegiate Spherical or Kite Balloon Operating Tournament

In view of the fact that, owing to the nearness to the Atlan-tic, it would be impossible to hold free balloon races from tie, it would be impossible to note free balloon races from Atlantic City, plans have been made for holding the Intercol-legiate Free Balloon Races elsewhere in the latter part of the Summer. To afford training to college men in the operation of balloon, there will be held a Three Stouths Intercollegian Balloon Operating Context, to be governed by rules similar to the rules for the seaplane tournament.

The contest will consist of the important work of lay out the balloon, inflating, and send it up, with two or more men on board, who will take observations and communicate with the people on the ground by telephone.

The trophy will be awarded for the speed and efficiency in laying out, inflating, and sending up the balloon, as well as for the work of the men on board.

Provision is being made at the Atlantic City Aviation Field for housing the land planes and balloons. Arrangements are also being made for housing and taking care of the seaplanes. Provision will be made for experts to look after the aircraft used for the intercollegiate races, and every facility will be given so that undergraduates, as well as graduates, can compete in the May contests with a minimum loss of expenditure of time

Great enthusiasm has been aroused in intercollegiate circles by the announcement of these intercollegiate aerial contests, and it is expected that the entries will be numerous and the events will be of great value to the nation, and will be a means of keeping up the development of American aeronautics as well as giving an opportunity to college men to participate in the program of aeronautics.

United States Army, Navy and Marine Corps aviators and balloon observers, in the Service or out of the Service, who wish to compete with the teams of their colleges or to start teams, should apply to Mr. Alan R. Hawley, chairman, Con-test Committee, Aero Club of America, 297 Madison Avenue, New York City.

ATLANTIC CITY CONFERENCE AND EXPOSITION COVERS ALL PHASES OF AERONAUTICS

W 1TH the success of the Aeronautical Exposition which has just closed in Madison Square, blazing a new era in the science of aviation, air pilots, engineers and manufacturers are looking forward with cager interest to the first big outdoor aviation event held in the world since 1914, the second Pan-American Aeronautic Convention and Exposition to be opened during the month of May at Atlantic City.

Reading the war news has made many persons conversant with the theory of flying; the indoor exposition at the Garden has given thousands a practical idea of the construction of aircraft; now those back of the Atlantic City affair believe that open air demonstration where attention will be paid to the commercial end of aviation, will show the business world that fiving is a fact and not a fad. The Exposition is to be held under the auspices of the Aero Club of America, the Aerial League, and the Pan-American Aeronautic Federation.

The idea governing the various contests at the Exposition will be in the main to prove that both the heavier-than-air and the lighter-than-air airship can be used to a good purpose in the world of business and the world of pleasure. There will also be lectures by experts on every phase of aviation with pictures and models. The aerial contests will be sanctioned under the rules of the International Aeronautic Federation, which governs all aerial contests.

There will be an efficiency marine flying contests, the awards made under the terms of the will of the late Samuel H. Valentine, being four prizes of \$1,000, \$500, \$250 and \$100. The flight will be over a sixty-mile course with the Steel Pier. Atlantic City as a starting point, and the Cape May Naval Air Station as a turning point. The winner will be the pilot who covers the greatest umber of laps on this course flying during the five Saturdays of the Exposition.

Glenn 11. Curtiss has offered a prize of \$1,000 to the first cuting 11. Curtiss has offered a prize of \$1,000 to the first entrant for the Curtiss Marine Flying trophy who covers the distance of 1,000 miles without stopping. There will also be an open scaplane speed contest for three prizes, \$1,000, \$500 and \$250. Two contests, open to graduates or undergraduates and \$250. Two contests, open to graduates or undergraduates of Ancrican colleges, will be the intercollegiate seanlane race and the intercollegiate land aeroplane race. A prize of \$2,000 is offered the winner in each of these contests.

There will be Army, Navy and Marine Corps contests in bomb dropping on floating targets. Also there will be the handicap dirigible race for the Aerial League of America's silver trophy. Aerial commuting will be another of the novel contests. To win the several prizes offered to aerial commuters, it will be necessary to have either covered the greatest distance commuting to the Exposition by aeroplane or to have made the most commuting trips, or to have made the

longest non-stop commuting trip. The Aeronautic Convention, which is to be another phase of the Exposition will be the largest event of its kind that the world has ever seen. The program includes an actual demonstration of aeroplanes, seaplanes, dirigibles and kite balloons. The Governments of all the allied and Latin American countries and their aeronautic, sporting, scientific, industrial and educational organizations have been invited to participate.

In order to afford a thorough discussion of the various lines along which aviation and aircraft have been developing, thou-sands of experts in different lines of endeavor related to aeronautics have been invited to attend. For instance, representatives of railroads, express, steamship and other transportation organizations will be invited to attend the discussion of "The Large Dirigible and Its Value for Transportation" and the Forestry Department of every State and every nation will send representatives to the illustrated addresses on the "Aerial Forest Patrol.

Other interesting discussions will be on the "Work of Aerial Office Squadrons and Why Every City Should Have One,"
"Aerial Mail Plans," "Aerial Exploration and the Use of
Aircraft for Coast and Geodetic Survey," "Aerial Jurisprudence," and "Aerial Navigation Instruments for Flying Over Land and Water.

The following men compose the contest committee for the Aero Club of America, which will have charge of the various contests and the awarding of the priest: Alan R. Hawley, Leul. Com. P. L. N. Belhinger, U. S. N.; Col. G. C. Brant, L. L. N. L. L. N. L. S. L. The following men compose the contest committee for the

AMERICAN ACES AWARDED DIPLOMAS OF MERIT

AT the meeting of the Board of Directors of the Aerial League of America which has its headquarters at No. 297 Madison Avenue, it was resolved to award the League's Diploma of Honor and Merit to the sixty-three American aces.

Diplomas are also to be awarded to the military balloon observers who distinguished themselves and whose services were meritorious.

With the Diploma there will be presented to each ace a fellow membership in the League. In the case where the aces have lost their lives, the Diploma and the membership will be presented to the mothers or parents.

The aces and their parents will be invited to the Aeronautic Convention to be held at Atlantic City from May 1 to June 1. where the presentation of the Diplomas will be made.

The aces to whom the League's Diploma and fellow mem-

bership were awarded today are as follows:

bership were awarded today åre as follows:
Captain E. V. Rickenhacker, of Columbus, Ohio; Lieut.
Frank Luke, Ir., of Phoemix, Ariz; Major Victor Raoul Lufbery, of Walingford, Coan, Major Reed G, Landis of Chiese, Marchael C. Lieut, Fields Kinley, of Gravette, Ark; Lieut, G. A. Yaugho, Jr., Lieut, B. Wassah, of Philadelphia, Penna; Lieut, Thomas G. Cassady; Lieut, C. E. Wright, of Cambridge, Mass, Lieut, Wang, C. Lieut, C. Carlon, C. Cassady; Lieut, C. E. Wright, of Cambridge, Mass, Lieut, Wang, C. Lieut, P. F. Baer, of Washington, D. C.; Lieut, P. F. Baer, of Fort Wayne, Ind.; Lieut, F. C. D. Hunter, of Swannah, Ca.; Lieut, Lieut, F. C. Lieut, P. F. Baer, of Fort Wayne, Ind.; Lieut, F. C. D. Hunter, of Swannah, Ca.; Lieut, C. Lieut, P. F. Baer, of Wayne, Ind.; Lieut, F. C. D. Hunter, of Swannah, Ca.; Lieut, C. Lieut, P. F. Baer, of Wayne, Ind.; Lieut, F. C. D. Hunter, of Swannah, Ca.; Lieut, C. Lieut, C

W. W. White, of New York, N. Y.; Lieut, C. Jones of San Francisco, Cal.; Captian R. M. Chambers of Memphis, Tenn.; Lieut, Harvey, Cook, of Toledo, Obio: Lieut, Lansing C. Holden, of New York, N. Y.; Lieut, K. H. J. Schoem, of Ark; Lieut, Leslie J. Rummell, of Newade, N. J.; Lieut, L. A. Hamilton, of Burdington, Vt.; Lieut, J. O. Creech, of Washington, D. C.; Lieut, Howard Burdick, of Broodkyn, N. Y.; Lieut, C. D. Diese, Cook, Caption, C. C. Lieut, J. A. Hamilton, of Burdington, V. Lieut, J. O. Creech, of Mount Hamilton, Cal.; Captian J. C. Vascoreclie, Deniver, Colo; Captain Edgar Tohn, San Antonio, Texas; Lieut, R. A. O'Nell, Mogelse Ariv; Lieut, Donald Hodion, of Levent, V. H. Stoyal, N. San Miss, Lieut, D. D. Deane, Concord, Mass; Lieut, A. R. Brooks, Framingham, Mass.; Lieut, R. O. Lindsay, Masson, N. C.; Lieut, M. Steneth, of H. Stoyal, Moson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, Masson, M. C.; Lieut, M. Steneth, of H. Stoyal, M. Steneth, of H. Stenet cord, Mass; Lieut, A. R. Brooks, Framingham, Mass; Lieut, R. O. Lindsay, Madison, N. C.; Lieut, M. Stenseth, of Twin Valley, Minn; Lieut F. K. Haye, Chicago, Ill; Lieut, H. C. Klotts; Lieut, Colonel William Thaw, of Pittsburgh, Penna; Major, D. M. Peterson, of Housedale, Penna; Captian H. R. Benkley, Aras ann., Mass., Morth Lindse, Mass., Lieut, P. A. Healty, Jersey City, N. J.; Lieut, India, S. Lieut, F. M. Symonds, of New York, N. Y.; Lieut, G. W. Furlow, of Manchester, Minn; Lieut, A. E. Eusterbrook, Fort Flagler, Wash; Lieut, B. Baucom, Milford, Texas; Lieut, J. E. Wehner, New York, N. Y.; Lieut, J. See, Wehner, New York, N. Y.; Lieut, J. E. Leut, H. H. George, Niagara Palls, N. Y.; Lieut, J. C. O. Donalsten, N. Y.; Lieut, H. H. George, Niagara Palls, N. Y.; Lieut, O. O. Donalsten.



THE NEWS OF THE WEEK



Banker Uses Aerople

Banker Uses Aeroplane
New York, Aarch 14.—The first serial bank
ing transiction was comminmated when Kalph
II. Mann, preceden of the Park Trist Compacy,
of Workester, Mass., inew from that city to
terant charles S. Jonne, surpliced by Internant Charles S. Jonne,
Stops were made as Springfield and New
Haven to transic business. Am Aun claims
to be the latt financier to carry on an banking
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Daniel Says New York and Market Library and Market Library Says New York New York Market Library Says New York N nations are doing, probling by their experi-

ence and sharing with them the hensett of our "Admiral Mayo, who is the Nay's representative on the Aircraft Production Board, is already a supervised to the Aircraft Production Board, is already and a start for our own fleet. If evil organize and direct the expanded campages of avision operations of the start of the supervised of the Aircraft of t

have the add of Captain Criscen, fresh from intensive wartime experience with ascreati.

Admiral Taylor Says Navy Will Make TransNew York, March 15.—The United States
Navy will be ready within a month to commissaid the said of the control of the control
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the said to cross the Altanox, according to all
advanture in charge of the naval air program.
Admiral Taylor also said the Navy Depositment
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Aircraft Exhibits to Be Flown Back to Factories Two Thomas-Morse planes which have been shown here will fly to their home, Ithaea, this week, both carrying newspaper reporters and trying for speed records.

Four Naval Planes Here for Flight Across

Doesan
Philadelphia, March 12.—Wings for two of the
four seaplanes from the Navy Department will
make selection for a flight from America to Eutope have been completed and tested at the
League Island, Navy Yard, and now are being
fitted to the airboats for which they were de-

fitted to the aircons-signed.

The seaplanes, which are of gigantic size and the N. C. I Naval Curtin type, are at present at Far Rockaway, New York, and it is expected the Navy Department will announce within a week

the date for the proposed flight. That it will be within a month is the declaration of Kear Admiral W. Taylor, in charge of the naval air pro-

The Dayton Wright De Haviland 4 which has been in the Larden will be installed as a Government exhibit at the Sunthsonian Institution. It is the first ste Haviland battle plane buth in this country and has been flown for 1,000 hours on the front in France.

the front in France.

Cherral Monther Amounces Air Service Plans
New York, March 15.—Major General Charles
New York, March 15.—Major General Charles
New York, Sharch 15.—Major General Charles
New York, Sharch 15.—Major General Charles
Interview the unmediate problems facing the War
interview, the unmediate problems facing the War
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naks. We shall return a sufficient number of his force.

"It the legal animal sufficient was the most of the force of the legal animal sufficient was the sufficient with the sufficient was the sufficient

Commercial aviation is going to come, but perhaps a little more slowly than most enthusiasts think. There is so much to do in providing proper landing belds, becausing pilots and making rules for awayation of the air.

World's Aititude Record Held By United States World's Altitude Record Held By United States New York, N. Y.—According to information received here on March 10, Major R. W. Schroe-received here on March 10, Major R. W. Schroe-received here on the second of 25,000. Ad-official ten of the altitude record of 25,000. Ad-official ten of the altituder coupleyed by Captain Long of the Royal Air Force on the recent light, and claimed, I read to the control of 25,000. Ad-cianced, I read to the control of 25,000. Ad-cianced, I read to the control of 25,000. The Long attained an altitude of only 27,000 feet. Major Schroeder nasie his flight at Dayton, Olto, on September 18, 1918.

Record New York to Hampton Roads Flight

Three hundred miles in 20 minutes was the record of two many flying boats that made the record of two many flying boats that made the record of two many flying boats that made the Noval And Statem at Rockwary, Point. The figures set a new monstep record for this The maximos left Humpton Rouds at 10 A. M. They passed over Athenic (if a 1236 and a 10 A. M. They passed over Athenic (if a 1236 and a 10 A. M. They passed over Athenic (if a 1236 and a 10 A. M. They passed over Athenic (if a 1236 and a 10 A. M. They passed over Athenic (if a 1236 and a 10 A. M. They passed over Athenic (if a 1236 and if a 1236 and if

one of the design will be groomed on a Atlantic trip.

A model of the F-5-L, type, to which the new Atlantic trip.

A model of the F-5-L type, to which the new Atlantic trip.

A model of the F-5-L type, to which the new to the following the

Department Store Uses Aerial Delivery

Department Store Uses Aerial Delivery Serve York, N. Y.—Averglane delivery of mer. New York, N. Y.—Averglane delivery of mer. Average of the Servery of the Servery of the Servery of the Servery of Meant Vertico, N. Y., in less than boar. The Island carried weighted 250 pounds, held the Servery of Servery of

twenty ave minutes after ten octoor in many and landed at the golf course at Petham Bay therty fore minutes later.

The load included a hungalow bed, large rug, floor lamp, carpet sweeper, a tabouret, percolator, three pillows, fireless cooker, curtains and draperies, two dozen napkins, tableeloths and tamels.

draperies, two towels.

The K6 motor and a duplicate set of the merchandise purchased by Mr. Shipler are on exhibition in a show window of Lard & Taylor's, Fifth Avenue and Thirty-eighth Street.



Loading the Curtiss Biplane, which transported household utensils from Lord & Taylor's Department Store in New York City to Mount Verson, N. Y.

Aerostatic Investigatora Return

Aerociatus investigatora Aesturn
P. W. Litchield, vice president and factory
unanager of the Goodyner Irre and Ruther Comadere having synchrite on nentla abroad.
Mr. Litchield, together with Rajph Uppon,
the famous Goodyner ballion expect, and Clifford
factories at Akron, formed the civilian part of a
military committee sent to Europe by the Nay
Department to study airship conditions in the
the Amistica.

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This duty took the Goodyner officials to EagThis duty took the Goodyner officials to EagThis duty took the Goodyner officials to Eagtop the Control of the Control of the Control
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been submitted to the Navy Department, topether
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Spokane Establishing Free Aerial Landing

Spekare, Wash.—As a result of the work of certablished as areal landing field, consisting of who acres of park land, for the free use of old cares of park land, for the free use of plane repair shop and flying school will be considered at the field, memerical Cab. May the control of the field of of

Airline to Catalina Island

Los Angeles—On his return from a recent trip of inspection to Catalina Island, his new scribility of the control of the control of the serial line of transportation for passengers be-tween the island and the mainland is one of the plans under consideration by the new officials of the control of the control of the control of the January of the control of the control of the January of the control of the control of the rights to establish an arime between Los Angeles and Catalina Island.

Naval Aerial Ambulance Demonstrated

Naval Aerial Ambulance Demonstrates
New York, March If.—In order to demon-strate the praeticability of the serral ambulance
David Gray, U. S. N., from Rockawer, New
York, to St. Luke's Hospital in New York Gity,
arm, was in the charge of Major Helen Bastedo
of the Motor Corpo of America, and the journey,
Keyer at 94th Sirrect to an ambulance on abore,
said therone to the hospital at 113th Streen, required only 45ty, minutes.

Bureau of Mines Announced New Aircraft Fuel

regarded as practical for commercial pusposes at present. Another combination developed by the hurseu, Another combination developed by the hurseu, consisting of benzol and gasoline, which has been found to be more powerful than gasoline alone, is expected to prove of value in industry.

Aeronautics as Part of College Courses

Arramatika in Part at Callage Gaurea
The Detains of Milliary Accountation, in cooperation with the Committee on Education and
Special Training of the General Stuff, has arspecial Training of the General Stuff, has arspecial Training of the General Stuff, has arspecial Training of the General Stuff, has arwhich will not interfere with their prescribed
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"Aerial Taxis"

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War Risk Insurance—Non-Delivery of Insur-ance Certificates

War Risk Insure Critificates
The Bureau of War Risk Insurance announces
that a large number of insurance certificates retanta undelivered. This is due to insufficient or
nature underlyered. This is due to insufficient
while in many others the address of the hencarry has changed and the certificate has been
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All officers and enlisted men whose insurance certificates have not here received either by themselves or by their beneficiaries should write to the Insurance Division, Bureau of War Risk Insurance, Treasury Department, Washington, D. C., stating the following:

a. Full name.

b. Rank and organization at the time of appli-

10. C., pating the tolorousig:
b. Rank and organization at the time of application for insurance.
b. Rank and organization at the time of application for insurance.
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c. Name and address of the heneficiary, if it is not desired that the certificate be sent to the heneficiary, its relations will be given to the heneficiary, insurance will be given to the heneficiary insurance will be given to the heneficiary that the control of the control of the Adjustian General of the Army that the control of th

Permanent Exhibit of Aircraft

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Miller the development of the science of aeronautic and, include many American and Farney
acceptance of Aerosian Compiler and Section (Compiler and Section (Co



The Bristol All Metal Machine, manufactured by the Criatol Aeroplane Co. of England. It is equipped with a Hispano-Sulza engine

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Navy Department lasues Statement on Hellum Development

Development

Washington, D. C., March 20, —The Navy Department succel a statement relative to the development of the statement relative to the development of the statement statement and the st

at hoth these plants."

To this statement, Director Van H. Manning, To this statement, Director Van H. Manning, To this statement, Director Van H. Manning, To this statement of Mines, replied that the Navy directoring helium. The discovery of helium in Kansa, Oklahoma and Texas is said to be due to the statement of officials of the British Government. Two large plants are located in Texas producing the gas in quantities.

ertiment. Two large plants are located in Texas The precess in roughy as follows:
Natural gas is collected and compressed and State of the College of the Co

Elaborate Decorations at the Aircraft Show

Elaborate Deserations at the Aircraft Shee New York—A Gature of the Argenization Fix-ford Register Aircraft (1997) and the Con-trol Register Aircraft (1997) and the Con-trol Register Aircraft (1997) and the Con-trol Register Aircraft (1997) and the Aircraft tons of Mr. Psy. L. Faurete, of the Aircraft Morning, Innove senterey juniters. The plus was to convert the entire walls and Morning factors and the Morning factors of Aircraft (1997) and the Control Register (1997) and Aircraft (1997) and the Control Register (1997) and value (1997) and the Control Register (1997) and value (1997) and the Control Register (1997) and the value (1997) and the Control Reg

a mean-space which the canvasses covering the walls had begun. This permitted the aeroplanes and halloons to repose on a landing field represented by the Garden floor. The accessories were placed on

the balcoxy, but the scenic walls consisted of toreground and background, and the toreground, and the toreground, and the toreground, and above it, should get exhibits they and blend-ong with, the sky or peaks which life yelevant, coding, few statemarys at different parts of the coding. Few statemarys at different parts of the Jack Alpine bodge at the western end of the dated retords at view of the Atlanta at the the transports which certain the American dough-ter and the statemary of the statemary of the termination of the statemary of the statemary. The the sorthern wall Atlastan peaks lay in the carriage and white of Colorado crops cells for the statemary was the colorador of the con-tory of the statemary of the statemary of the control of the statemary of the statemary of the control of the statemary of the theory of the statemary of the

To Maletain 22 Fields for Aircraft

Washington, March 13.—The War Department has a ranged to maintain twelve temporary flying hields, which will be used for storage purposes, four permanent balloon fields and four perma-tent training belds, and at least two experimental

four permanent balloon islds and Tour permanent balloon islds. and it least two experiments fields.

The first intendent or retain only two training foods, many the permanent of the continuous foods, and the continuous foods are the continuous foods and the continuous foods and the continuous foods are continuous foods and the continuous foods are

Brooklyn Building to Have Landing Place On Roof

Brooklyn, N. Y., March 17.—The Gibbons Com-posity, builders, have announced that the new building for which they are just breaking the top. It is to be five stories high and will have top. It is to be five stories high and will have a frontage of 175 feet. Tenants of the building will have extended to them the privilege of using the landing place for commercial serial delivery.

Aviation to Come to its Own as International Sport
New York, March 17.—Licutenant J. O. Donaldson, a fiving officer with eight German machines to his credit, who was captured but escaped to Holland, in an interview upon his return from overseas, predicted that increes in

international aviation meets would exceed that of any other internation meets would exceed that of any other international sport. Automobites, motoroosis and yacht races will make way in the popular interest for the international avastion ince, with its seapiane and aeropiane races and turning acrobates. The recent speed and looping records, which have each been proken several nece, with its scapane and actopiane races am intriling acrobates. The recent specia and loop ing records, which have each been oroken severa times in the past tew weeks, foreshadow the great interest which will be centered anoth, acro nautic achievements.

New York Aerial Police Field Selected

New York Aurial Police Field Selected
New York, March 17—Geogeter John F.
Lwyer, of the New York Police Department, aunounced that the Joh Police Department, aunounced that the John Police Selection of the Selection
will be distincted to provide a landing place for
half the John Police Department of the John
Importor is quipored as staing that fifteen firer
have already been emisted in the Aeronausic
Branch of the Police Department, Filled-in
ground along the Hudson River near west Eightysouth Street will be used for hanges.

Daniels Talks by Radio with Seaplane 150 Miles Away

Daniels Talks by Realls, with Seaplane 120 Miles Assay
Seared at his desk in his office in the State, War and Navy Hudolug, Secretary Jiamels the Sware May and May Hudolug, Secretary Jiamels the seaplane of the Seaplane of



The Bristol Type Braemar Triplane Bomber with 4 Pume Engineer



The AIRCRAFT TRADE REVIEW



Aeromarine on Pre-War Baais
Keyport, N.J.—The Aeromarine Plane and Motor Company has got hack into production on a
for company has got hack into production on the construction of the 1story building, 60.
100 (t., for the New Jersey Motor Sales 60.
napany, which builds engines used by the Aeromarine company, has been resumed.

Small Curtisa Training Plane Makes Long Flight

Small Curtiss Training Plane Makes Long New York, Mrs 1947, 1979, and Curtiss Training plane which has had more those of the property of the p

Personal Pars

A. Lndlow Clayden has resigned as consulting engineer for the Wright-Martin Company. He will establish a consulting engineering business will establish a consulting engineering business for the consultation of European propositions for Ambert Interestingtion of European propositions for Ambert Interest Mr. Clayden spent most of 1918 in Europe, studying methoda of manufacture of the Hispano Suiza motors.

Neil MecCull, contributing reclured editor to Assas, Am. but retrieved from duty in Fore-tee with the Naval Air Forces, and is now connected with the Texas Company as Automotive Engineer in the Sales Department with headquarters in mechanical engineer in the machine works of the Westinghouse Electric and Manufacturing Company, of Pithburgh, Pa.

Officials Undecided About Status of Self-Imported Aeroplane

Imperted Aeroplana
Washington—Curons authorities have encounted to the control of the control of

3,018 American Aeroplanea in Europe On November 11

The A. E. F. had 3,018 planes equipped with Liberty motors at the front when the armistre serial Core was a constant of the control of the co

Fishermen to Use Aeroplanes

Fishermen to Use Arroplanes.

High M Smith, of Washington, D. C., Comissioner for the Bureau of Fisheries, has InBard of Trade of Massachusetts to have ser-cral staplanes as scouts to accompany the fishing the fishing grounds about the middle of April. It was nointed out that the secuting experi-ical studies to the most the direction of a pre-cise versed in identifying fish schools and esti-nating their size.



Julius M. Meirick

Julius M. Mericks

Julius N. Merick Superintendent of Publisher, Sanadrad Anterath Corporations, Ekindekin, Ilitary, Sanadrad Anterath Corporations, Ekindekin, Charles and Greeful Control of the Company accounts of the Com

American, recrem publications also servance activities.

maker's of news vision, backed by organizations, nust achieve financial gain, glory and fame."

In 1898 Mr Meirick gave up his business to enlist in the Spanish-American War, being one off the first to volunteer, on April 29. He was mustered out with his regiment in December of

He was for twenty years proprietor of the Commercial Photo Company of Newark, N. J., particular of the Commercial Photo Company of Newark, N. J., particular of the Commercial Photos of the Photos of the Commercial Photos of the Commercial Photos of the Photos of the Commercial Photos of the Commercial Photos of the Photos of the Commercial Photos of the Commercial Photos of the Photos o

Charles Freesch has resigned as aeronautical mechanical engineer for the Government and is now designing engineer for the Fergus Motors of America, Newark, N. J.

Aero Club of Pennsylvania Urges Municipal Aerodrome

The Aero Club of Pennsylvania will go before Ccuncils to urge a municipal aerodrome for this city. The decision was taken last night at the monthly meeting of the organization to the Belle-vue Stratford.

monthly meeting of the organization to the Belle-Leutenman Raby T. Folswell, of the navel avia-tion corps, read a report on available lending to the property of the property of the read-station, measuring 145 acres, and for which the measuring 145 acres, and for which the states place of the read of the read of the read-station, measuring 145 acres, and for which the street place, embracing 5,000 acres, for which an acres cleaned station, of the property of the service are true of the deep read-peared that the city might give the field from Thirty third street to the Saluphull River and property of the property of the property of the proper-ty of the property of the prope

from the Last Fark fiver drive to the fiver for the purpose.

The reason for the move, Lieutenant Folwell explained, is that it is estimated 100,000 aviators will return to this country who will desire to remain in flying activities.

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To Stere Unusued Army Planes
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Washington, D. C., March 12.—Acting Serve
Washington, D. C., March 12.—Acting Serve
Washington Committee of March 12 to stere for
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she Great Lakes, and one each in Georgia and Dillinon. Department, however, is planning an advertising campaign to dispose of material, fin-sished parts and special tools designed for the aircraft program. It is onderstood that no uniform the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the c

Zenith Equipment on Record Packard

Zeith Equipment on Record Packard
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engine bod also piled the stuny of official spereclusive the compound of the compound of the
action and eliminates advantages. Speed convariation, are sure to reveal any weaknesses as
well as demonstrate the real merit of any assenmed as demonstrate the real merit of any assendue part of the carella metals or encapitate.



proplanes to Make Victory Loan Flights

Aeroplanes to Make Victory Loan rights
Washington, March 15.—There flying "circuses" of aviators will tour the United States
giving sharn battles in the air end performing
acrobatics over the principal cities as a feature of
the Victory Loan campaign, which opens on

groupe dame battle in the air end performing the Victory Loss campaign, which opens on ATA and anomacinement was anthorized by the Pressury Department. The torn is intended to Pressury Department. The torn is intended to the Control of the Contro

development.

The country has been divided into three sections for the Victory Loan flights. Eastern, Middle

Western, and Western. A squadron made up of American, French and British Byern with American French and British Byern with American French and British Byern with French and French Byers have already left France for the France f

trips over German lines.

Photographiers of the Signal Corps will accompany each squadron. They will take photographs of each of the American etiles visited, the plates and hurried reproductions made for the benefit of the residents of all cities visited.

The general program to be followed in each city visited will be as follows: Two American

scout planes will rise to drop Victory Loan literature over the city. Four of the captured German planes will then stack these two American Planes. Four American planes will drive off constraints of parial acrobatics. Paratile will precede the flights. Citizens will be able to see the planes unloaded and set up in the morning and knocked down again for shipment after the flights.

and knocked down again for alignment after the washington, Dr. C. Rechmond, Landrason, Santrason, Santrason, C. R. Rechmond, Landrason, Santrason, C. R. Rechmond, Landrason, Santrason, C. R. Rechmond, C. Rechmond, C. Rechmond, Landrason, C. R. Rechmond, R. Rechmond,

UNITED STATES POST OFFICE AIR MAIL SERVICE

Monthly Report of Operation and Maintenance

JANUARY, 1919

_					3 8	11		-						SERVICE AND UNIT COST					
Aeroplane No	Gasoline	Greate and Oil	Office Force	Matorcycles, Trucks	Rent. Light. Power, Teleph and Water	Miscellaneous	Pilots	Mechanics an Helpers	Repairs and Accessories	Interest on Investment	Departmenta Overhead Charge	TOTAL	Gallon of Gasoline	Total Time Run	Total Miles Run	Males Kun per Gallon of Casoline	Cost per Hour	Cost per Mile	
2 3 4 38262 38274 38275 38279 38362 39363 39364 39365	\$70.21 177.25 17.93 109.38 17.89 101.12 86.10 60.09 105.97 35.40 87.92 84.44	\$30.94 69.88 9.12 43.46 6.08 42.91 25.72 33.41 24.58 4.86 18.59	\$61.94 61.94 29.12 61.94 41.94 61.94 61.94 61.94 61.94 61.94	\$79.96 79.96 79.96 79.96 79.96 79.96 79.90 79.90 79.90 79.90 79.90 79.90	\$55. 59 35 59 14 88 55 59 26 07 55 59 55 59 55 59 51 19 55 59	\$136.12 136.12 136.12 136.12 136.12 136.13 136.13 136.13 136.13	386 40	473.05 281.41 303.20 291.47 306.77 283.96	\$29.95 40.00 63.52 100.10 29.95 6.00 29.00 31.10	\$97.34 97.34 97.34 97.33 97.33 97.33 97.33 97.33 97.33 97.33	\$140.15 140.15 140.16 140.16 140.16 140.16 140.16 140.16 140.16	1.717 70	231 582 59 359 59 333 282 198 350 118 337 276	br. min 11 48 33 34 20 13 1 55 29 34 13 29 17 05 6 04 15 56 6 43	872 2407 1664 128 1706 899 1157 536	3 77 4 14 4 64 2 17 5 12 3 19 5 84 1 53 3 58 2 04	\$103.40 51.17 67.27 463.88 46.27 85.37 64.49 187.64 76.94 169.34	817 6.940 .802 1.280 .952 2.123	
Total	\$953.70	\$348.43	\$641,34	\$959.82	\$552.45	\$1.633.50	\$1,800 00	\$3.534.47	\$467.98	\$1,167.99	\$1,681 90	\$13,741.58	3184	156 21	11138	3.50	\$87.89	\$1.233	

Cost per mile, overhead, \$.4492: cost per mile, flying, a.2785; cost per mile, maintenance, \$ 5060



THE "NC-1" NAVAL FLYING BOAT

HE NC-1 Naval Flying Boat, built THE N.C-I Naval Flying Doar, Dunit by the Curtiss Engineering Corpora-tion at Garden City, L. I., was de-signed by the Bureau of Construction and signed by the Bureau of Construction and Repair, under the direction of Naval Con-structors Hinsacker, Richardson and Westervelt. It is one of the largest boats ever built and on November 8, 1918, flew with fifteen people from Long Island to Washington, D. C., and thence to Hamp-ton Roads, Va. A worlds record for ton roads, va. A world's record for passenger carrying was established when a flight was made on November 27 with 51 people abourd. On these flights the boat was flown by Lieutenant David H. McCullough, U. S. N.

The usual crew is composed of five The usual crew is composed of nive officers and two enlisted men. Two pilots sit side by side in the central nacelle aft of the engine. Dual controls are in-stalled. A machine gunner is placed at the bow of the hull and another gunner in a turret built into the top wing, and reached by way of a ladder which runs up through the pilot's nacelle from the boat hull.

The fuel tanks contain 300 gallons of gasoline, sufficient for a flight lasting

General Dimensions
Span, upper plane
Span, lower plane 96' 0'
Chord, both planes
Gap between planes 12' 0"
Overall length
Overall height
Weights
Net weight
Gross weight (fully loaded) 22,000 lbs.
Useful load
Performances
Maximum speed
Climb in ten minutes 2,000 feet
Maximum range of endurance 13 hours

from either side of the hull are 10' 8" in span; outer sections 35' 4".

There is a clearance of 3/4" between all

plane sections.

Outer lower sections have a 3-degree dihedral. All other plane sections are in a flat span.

Interplane struts above the hull are spaced 5034" apart. Between these struts at a height of 6' 10.3/16" from the lower at a neight of 6 10.3/16 from the lower front wing beam is the center nacelle which carries the engine and the pilot's compartment. Outer motor nacelles are centered 11' from the center of the ma-chine. The interplane struts carrying them are spaced 3' 31½" apart.

them are spacets of 3174 apart.
Center sections of the main plane terminate 4½" beyond the outer nacelle carrying struts. Another set of interplane struts are located 26 11" from the center line of machine. From these the outer struts are centered 14 7", leaving an overhang on the upper plane of 15' 6 and of 6' 6" on the lower plane.

Ailcrons attached to the upper plane are 36 '65' long and have a chord of -43'; ends are balanced. At the halanced portion the chord is 6' 1½' and the balanced portion extends 6' beyond the end of rear main wing beam. There is a clearance of 3' between inner ends of ailcrons and 3' between inner ends of ailcrons and

the main plane. The main planes have a chord of 12'. Forward main wing beam centered 16½" from leading edge; beams centered 84" apart; trailing edge 43½" from center line of rear beam. Gap between planes, 13' 61/4". Because of the dihedral of the lower plane, the gap decreases to 12' at the outer strut. Lower wing beam is centered 51/4" below top deck of the hull.

The overall length of the hull is 44' 834". The step is located 27' 834" from the nose. Maximum width of hull is 10'; maximum depth, 7' 534". Leading edge of upper main plane located 18' 2" from

Tail Group

The tail is of the biplane type. It is carried on three hollow spruce outriggers. Elevator hinges are located 34' 8 3/16" from the trailing edge of the upper main from the trailing edge of the upper main plane. Gap between tail planes, 9 37. The lower tail plane is located 107 117 above lowest point of the hull. Span of above lowest point of the hull. Span of the planes of the planes of the planes allerons. The allerons extend 417 beyond ends of the planes. The span of the lower stabilizer plane is 26° at the ailerons. Balanced portion of ailerons extends 377 beyond ends of lower stabilizer plane. The chord of the balanced portion of belton plane. ailerons is 55'

There are three rudders and two fins. The center rudder is balanced and the outer rudders are hinged to the vertical

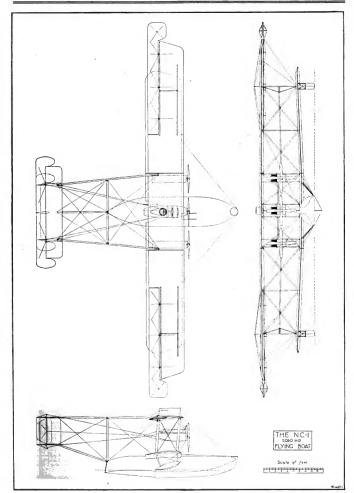
Engine Group

Three Liberty engines are carried in nacelles between the planes. The engines, low compression Navy type, each develop about 350 H.P. Four-bladed tractor propellers are used, 10 10° in diameter. A clearance of 12° is allowed between tips of central propeller and tips of adjacent propellers.



The NC-1 Flying Boat, which will probably attempt the Trans-Atlantic flight





A SIMPLE BENDING ALLOWANCE CHART FOR SHEET METAL

By E. S. Bradfield, Formerly of the Engineering Department of the Naval Aircraft Factory

O NE of the commonest errors on aeroplane fitting drawings are the bending allowances on flat patterns. In allowance cases the bends are 90 degrees, and the bending allowance is the distance on the neutral axis of the metal, beginning at the point of bend and measured to the end of the

At the bottom of the chart are the thickness of the metal, both in B. W. G. and fractions of an inch. On the right-hand side is the inside radius around which the bend is made, in fractions of an inch. On the left side is the bending allowance in fractions of an inch. It is usual practice to give all sixty-fourth of an inch.

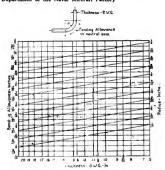
skey-fourth of an include and the bending allowance. If, for instance, it is desired to find the bending allowance. If, for instance, it is desired a sixteenth of an inch radius, with a ninety-degree bend, we go up the line from 17 until it, with a ninety-degree bend, we go up the line from 17 until it instructed to the line, and from that point draw a line to the right side of the chart, where we find it is midway between ½" and 5/32" or 9/6" is the bending allowance.

The formulæ on which this chart is based is that,

B. A. =
$$\frac{pi}{2} (R + \frac{t}{2})$$

= $\frac{pi}{2} R + \frac{pi}{2} \times \frac{t}{2}$

From which it will be seen that for a given radius, B. A. is equal to a constant plus a variable which varies directly with t. And by calculating this for different radius and thickness, and plotting same, this chart was obtained.



BENDING ALL WANCE CHART

DIMENSIONS OF STEEL TUBE STRUTS

By E. S. Bradfield, Formerly of the Engineering Department of the Naval Aircraft Factory

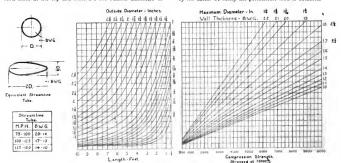
THIS chart was prepared from a similar chart that appeared in the trade papers several months ago, but is given in the units used in our practice, that is, inches and B. W. G. Also the ultimate strength is given, for mild steel tubes, which have an ultimate strength of 70,000 lb. per sq. in.

After preparing this chart a series of 25 tests were run to verify the same and the results of these tests agreed with those indicated by the chart. While certain advantages would it is usual practice to use mild carbon steff eather areingh, it is usual practice to use mild carbon steff eather as they are easily obtained and readily worked.

The figures at the bottom of the left graph are the length in feet, those at the top and sides are the outside diameters in

inches. The figures at the top and sides of the right graph are the wall thickness in B. W. G., and above them is the maximum diameter of tube that can be used with that wall to the state of the side of the sid

left is that of a stream-line tube of equal strength to a circular one. Immediately below are the best wall kinkensess for To find strength of tube 0½ feet long, 1½ inches diameter and 16 B. W. G., go up vertically from 0½ on the length in feet until intersection with the curve for diameter of 1½; which will be considered to the control of 1½; which will be considered to the control of 1½ of 10 B. W. G., and then going vertically down we read the ultimate strength of 4700 pounds, and dividing this by the factor of safety the permissible load is obtained.



STEEL TUBE CHART.

SECOND PAN-AMERICAN AERONAUTIC CONVENTION AND EXHIBITION

To Be Held Under the Auspices of The Aero Club of America, The Aerial League of America and the Pan-American Aeronautic Federation.

> From Thursday, May 1st, 1919, June 1st, inclusive, Atlantic City, N. J.

CONTESTS TO BE HELD EACH SATURDAY

- (1) Seaplane Contests (general),
- (2) Curtiss Marine Flying Trophy and Prizes.
- (3) Intercollegiate Seaplane Contests,
- (4) Land Aeroplane Contests,
- (5) Dirigible Contests,
- (6) Kite Balloon Speed in Ascending and Descending, and Maneuvering Contests.
- (7) Parachute Competition.
- (8) Aviette (bicycles and motorcycles with wings) Contests.

EVERY DAY ACTIVITIES

- (1) Exhibits of Aeroplanes, Motors and Accessories on the Steel Pier,
- (2) Demonstrations and tests of Seaplanes, Land Aeroplanes, Motors, Dirigibles, Kite Balloons, to prospective purchasers and representatives of different gov-
- (3) Aerial Passenger Carrying by seaplanes and dirigibles, and kite balloon
- (4) Moving pictures and Addresses by leading authorities on most important phases of aeronautics.

The Governments and Aeronautic, Sporting, Scientific, Industrial and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are invited to send representatives to attend this great aeronautic event. On arrival in the United States these to send representatives to attend this great aeronawtic event. On arrival in the United States three representatives should call at the Headquarters of the Convention Committee at No. 20% Madison. In the event that it is more convenient for them to go directly to Atlantic City threy will register at the affects of the Convention located at the following Aduatic City these: Hotel Trayware, Hotel Challonte, The Breakers Hotel, Hetel St. Charles, Hotel Mariborough-Blenhem, Hotel Challonte, The Breakers Hotel, Hetel St. Charles, Hotel Mariborough-Blenhem, Hotel Challonte, The Overstin Committee will be at the Bureaus of the deronautic Convention at the above-named hotels and will inten the official badges which admit the beaver to the Aeronautic Mall, as weld as the deep Sakshitten on the Steel Fire, the judges enclosure during

contests, and to the Aerodrome and scaplane stations where the aircraft and motors will be demonstrated.

All communications until May 1st, should be addressed to Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City.



DAILY PROGRAM FOR PAN-AMERICAN AERO-NAUTIC CONVENTION, EXHIBITION AND CONTESTS

THURSDAY, MAY 1ST

Opening of Convention and Exhibit.

AFTERNOON—Reception at Aeronautic Hall on the Steel Pier. Addresses by United States Government State and aeronautic authorities.

EVENING-Aero Show and addresses by officials.

FRIDAY, MAY 2ND

AFTERNOON-Aero Show. Preliminary tests of seaplanes, dirigibles and kite balloons.

EVENING-Moving pictures and address on flying for sport and pleasure.

SATURDAY, MAY 3RD

AFTERNOON-Seaplane and dirigible races, and kite balloon ascending and descending contest.

EVENING-Ball.

SUNDAY, MAY 4TH

MORNING-Memorial service by eminent Divine for the dead airmen.

AFTERNOON AND EVENING—Reception to allied aces and heroes of the air and their parents, and announcement of the award of the Aero Club of America Medal of Valor, and the Aerial League of America Diploma of Honor.

MONDAY, MAY 5TH

AFTERNOON-First parachute contest for \$500 Bennett Prize.

ENING—"The Large Dirigible and Its Value for Transportation." Representatives of railroads, express, steamship and other transportation organizations invited to attend.

TUESDAY, MAY 6TH

AFTERNOON-Illustrated addresses on "Aerial Forest Patrol." Forestry Department of every State

EVENING—"Work of Aerial Police Squadrons, and Why Every City Should Have One."

WEDNESDAY, MAY 7TH

AFTERNOON AND EVENING—Aerial Mail Day. Illustrated address on, and consideration of Archard Mail Planes. *Chairman of Post Office and Post Roads Committees of House of Repand Post Roads Committees of House of Repand Post Roads Committees of House of Repand Post Roads (25,000 United States Postmasters, and Chambers of Commerce of 13,000 cities invited to attend.)

THURSDAY, MAY 8TH

AFTERNOON AND EVENTING—Illustrated addresses on the "Need of Municipal Aerodromes, Planning." Chambers of Commerce and City Planning Commissions of 13,000 cities invited to attend.

FRIDAY, MAY 9TH

AFTERNOON—Arrival of seaplanes and army planes from Army and Navy Air Stations. Second parachute competition for the \$500 Bennett Prize.

EVENING—Illustrated addresses on "Latest Develop-ments in Aerial Warfare and Adventures in Aerial Warfare," told by famous aces.

SATURDAY, MAY 10TH

AFTERNOON-Army, Navy and Marine Corps Day. Aerial contests and tournament,

EVENING—United States Army and Navy Officers' Reception. Reception and addresses at Aero-nautic Exhibition Hall on the Steel Pier.

SUNDAY, MAY 11TH

AFTERNOON AND EVENING-Presentation of the flags by each State of the United States to the Aero Squadrons representing the States. the Aero Squadrons representing the States. Each State will present a flag to each Aero Squadron, the members of which were over-whelmingly natives of that State. The presenta-tion will be made by representatives from the State and the Aero Club and Aerial League branch of that State. All States and cities invited to send delegates, and Army, Navy and Marine Corps to send representatives.

MONDAY, MAY 12TH

AFTERNOON—Demonstrations and illustrated ad-dresses on the "Value of Aircraft for Advertising by Day and by Night." All national advertisers and advertising agents invited to attend.

EVENING—"Pan-American Aerial Transport Over Land." Addresses by members of the commis-Land." Addresses by members of the commis-sions of the 20 Latin-American Republics.

TUESDAY, MAY 13TH

AFTERNOON AND EVENING—"Pan-American Aerial Transport Over Water." Addresses by members of the 20 Latin-American Republics'

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH

AFTERNOONS AND EVENINGS-"The Airways and Aerial Transport in Europe, Canada, Africa, Australia and Asia."

FRIDAY, MAY 16TH

AFTERNOON AND EVENING-"Aerial Navigation Instruments for Flying Over Land and Water." Aviators, navigators, scientific instrument makers and aeronautic experts invited.

SATURDAY, MAY 17TH

AFTERNOON-Aerial races and contests. Illustrated addresses on Aerial Photography,

EVENING—Extensive exhibit of aerial photographs and photographic apparatus. All photographers, professional and amateur, and makers of photo-graphic apparatus invited.

SUNDAY, MAY 18TH

AFTERNOON AND EVENING—Illustrated ad-dresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey."

MONDAY, MAY 19TH

AFTERNOON-Addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators.

EVENING—Illustrated address on "How Army Medi-cal Standards and Inspection Lessen Accidents," Insurance companies and agents invited.

TUESDAY, MAY 20TH

AFTERNOON AND EVENING—Illustrated ad-dresses showing different ways of crossing At-lantic by air and the problems to be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST

AFTERNOON—Aero Safety Day. Discussion of aero safety provisions made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in

EVENING—"Progress Made in the Art of Piloting Aeroplanes." Illustrated.

THURSDAY, MAY 22nd

AFTERNOON AND EVENING—Addresses and discussions of meteorology—'How the Weather Forecasts Can be Extended and Made More Efficient by the Use of Aircraft in Exploring the Upper Air," also 'How the Weather Forecasts Help Aerial Navigation," and 'Telegraphic and Climatic Factors in Rehalion to Aeronautics.

FRIDAY, MAY 23RD

AFTERNOON AND EVENING-Addresses on "Aerial Jurisprudence—Aerial Laws and Regula-tion of Air Traffic." (First day.) Lawyers, traffic commissioners and police authorities of different countries invited.

SATURDAY, MAY 24TH

AFTERNOON—Races and contests.

EVENING—Illustrated address on "Need of Establishing Altitude Levels for International, Interstate and Interurban Air Travel."

SUNDAY, MAY 25TH

AFTERNOON AND EVENING—Aeronautic Art Day, Address on "Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paintings," by Lieut. Farre, Lieut. Ruttan and Paintings," by Lieut. Farre, Lieut. Ruttan and others. All prominent artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK

MONDAY, MAY 26TH

APTERNOON—"Aeronautic Engineering Prob-lems and Their Prospective Solution." EVENING—Opening of contests for designs and ideas for large aeroplanes.

TUESDAY, MAY 27TH

AFTERNOON-Factors That Increase the Efficiency

for Large Dirigibles."

EVENING—"Advantages of Veneer and Plywood for Aircraft Construction."

WEDNESDAY, MAY 28TH

AFTERNOON-Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective EVENING-"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON-"Flying Boats Versus Hydroaero-planes for Sport and Transportation."

EVENING-Contest for designs and ideas for large

FRIDAY, MAY 30TH (Memorial Day)

AFTERNOON-Dirigible races, kite balloon speed

ascending contest; parachute contest.

EVENING—Reception at the Aeronautic Hall, Steel Pier.

SATURDAY, MAY 31ST

AFTERNOON—Seaplanes, land planes and dirigible contests. Aviette competition at which all cyclists and makers of bicycles and motorcycles will be

EVENING—"International Medical Standards for Aviators in War and Peace." Reports from dif-ferent countries illustrated with attractive films. 50,000 medical men invited.

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING-Award of prizes and diplomas for all events.



The Aircraft Advertising Agency aims to cover the whole advertising field for aeronautics, including:

The advertising of Aircraft and Accessories in periodicals and elsewhere.

Display advertising on Dirigible Balloons, and Kite Balloons, Acroplanes, and Streamers from Aircraft, and by the dropping of Souvenirs and handbills from the air.

Rates on application. "AERO EXPERTS"

The members of the Aircraft Advertising Agency are all ex-officers of the United States Air Service, with both theoretical and practical knowledge

in the Aeronantic Field, assuring expert service for elients.

Granville A. Pollock, President of the Aircraft Advertising Agency, Inc., previous to his release from the Army with the rank of Captain, served in the war from its beginning and was a member of the famous "Lafayette Escadrille." In addition to this practical war service, Captain Pollock is by

profession an aeronautical engineer.

S. Herbert Mapes, 1st Vice-President of the Aircraft Advertising Agency, is another Air Service Captain who has recently laid aside his uniform after having served in important capacities at various aviation training fields in this country. He is well known as an automobile racer, an exhibitor of saddle horses and a winner of Horse Show Blue ribbons, as well as being

a member of many prominent clubs.

Reed Gresham Landis, of Chicago, 2nd Vice-President of the Aircraft Advertising Agency, and lately a Major in the American Air Service, has the added distinction of being the second ranking American "Ace" with 12 Air Victories to his credit. Major Landis is the Western Representative of the Aircraft Advertising Agency, to whom prospective clients in that territory may apply for information regarding service and rates.

William Menkel, Secretary of the Aircraft Advertising Agency, also served as a Captain in the Air Service, holding various positions at Washington and in the field. He was for five mouths, and until the end of hostilities, Commanding Officer of the efficient Aviation Repair Depot at the Speedway, Indianapolis, Ind. Previously to entering the service, Captain Menkel was for more than 15 years associated with the American Review of Reviews.

The Aircraft Advertising Company is now booking the space for exhibitors at the Second Pan-American Aeronautic Convention and Exposition at Atlantic Gity, N. J., May 1 to June, 1919, and also has charge of the preparation of the elaborate souvenir Program, advertising rates for which may be had on application.

SYSTEM OF TESTING FUEL JETS IN ZENITH CARBURETORS

THE manufacture of Zenith carburetaors presents many interesting features. Extreme accuracy of workmanthy. The sential and many operations on the property of the sential and the property their delicacy and skill to the manufacture of fine watches. The inspection of finished parts is particularly thorough, and instruments for measuring and gauging instruments for measuring and gauging visible to the eye. Many girls and women are employed, and their keemess of perception, interest in the work and nature against a conductive to successful reequipments.

One of the most interesting, as well as important, operations is that of testing the fuel jets. The measuring orifice of a jet is so small and its flow is dependent upon so many factors that it must be tested by actual flow of a liquid. The accompaning tree of the jet testing most of the property of t

All the Zenith jets are tested by the flow method. This consists in measuring how much water will flow through the trained at a civen height above the left trained at a civen height above the left. It would readily be seen that this is the enacreat possible approximation to the conditions to which the jet will be subjected into the carbureton.

In order to make these tests in the quantities that are required by the output, we have been led to build special machinery. One of these machine is shown in Fig. 1. It consists of a large tank in which a float controls the nite of the water in such a manner that level of the water is maintained at a given

point (a). From this tank four pipes extend downwards and terminate in a special valve (b) under which the jet under-test may be elamped. When the valve is opened, the water flows through the jet into a special glass graduate (c), which can be quickly emptied by turning

	RA	TE 0	FF	_0w	UND	ER II	M.HE	AD
JET	NO.	COMP	JET				NO.	
35	50	42	243	120	265	653	190	714
42	55	52	266	125	288	695	195	754
50	60	62	289	130	311	735	200	784
60	65	72	312	135	338	775	205	825
72	70	83	335	140	368	815	210	870
85	75	95	360	145	397	845	215	915
100	80	109	387	150	425	870	220	960
115	85	121	416	155	455	910	225	1010
132	90	140	445	160	483	940	230	1060
149	95	158	475	165	514	970	235	1110
166	100	176	510	170	550	1000	240	
184	105	195	545	175	596		245	
202	110	215	583	180	634		250	
220	115	240	613	185	675		255	

a valve (bi) at the lower end of the graduate.

The clamping of the jet is done by a lever, and a spring at the rear of the machine presses each lever into the valve, thus clamping the jet. A pedal (b) is provided for releasing and opening these clamps.

In order to measure with accuracy the time during which the flow is taken into the graduate, a small sheet-brass box (see Fig. 2-E), is used, which can be known to be supported by the supported

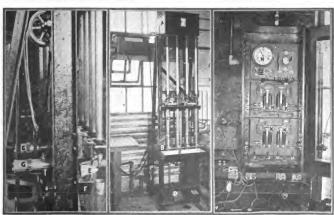
the box.

To control the time, the electrical aparatus shown in Fig. 3-H is used. On control the many shown in Fig. 3-H is used. On clock (th), which makes a contact every half second. Below the clock is a telegraph relay (i), which receives these implies and transmits them to an electric clock movement (j) on the right side of the upper panel. This secondary clock movement arranged to make contacts tribute them to the large relay (k) shown on the second and third panel. These relays, in turn, actuate the four solenoids of each machine.

On each machine the flow is sent to the graduate for one minute and diverted for one-half minute, thus making a cycle of 90 seconds. One-half of the machine is made to lag behind the other half by 45 seconds in convenience in operation.

seconds in convenience in operation.

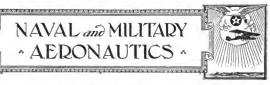
One operator cau, with this machine, test four jets in one and one-half minutes, or 160 jets an hour.



Special machinery in Zenith Laboratory for testing of fuel jets



NAVAL and MILITAD · AERONAUTICS ·



Key to Abbreviations

to a whom to the seed in the seed of the s

RSD-Report to Rockwell Field, San Diego,

RWT-Report to Rick Field, Waco, Text.
TFT-Report to Talasterro Field, Fort Worth,
the number of the field is given in
TMA-Report to Talasterro Field, Montgomery,
UTA-Report to School of Military Arennatry Utaraster of Taylor Field, Montgomery,
UTA-Report to School of Military Arennatry Utaraster of Texts, Austin tire, University of Texas, Ausun Tex. WDM-Wire Director of Milltary Aeronau-tics upon arrival. WFO-Report to Wilbur Wright Field, Fair-field, Ohio.

Notes

Note 1-Report to places mentioned in the Note 1—Report to places mentioned in the drief named.

Note 2—Report to Keenan Building, Pittsrigh, Pa.

Note 3—Report to Coronado, Cal.

Note 4—Report to Fayetteville, N. C.

Note 5-Report to General Hospital, Hot Note 5—Report to General Springs, Ark.
Note 6—Report to 360 Madison Avenue,
New York City.
Note 7—Report to Baltimore, Md.
Note 8—Report to Little Rock, Ark., supply

Ark, to Service 8—Report to Hot Springa, Ark., to Navy General Hospital.
Note 10—Report to Godman Field, Camp Knex, Stutkton, Ky.
Note 11—Report to Camp Meade, Admiral, Md.

Note 12—Report to Camp Upton, Long Island, N. Y.

Note 13—Report to Headquarters, Southern Department, Fort Sam Houston, Texas.

Note 14—Report to General Hospital No. 21, Denver Call.

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0	Reading, Wm. MDMA
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15	Brigadier-General William Mitchell, Director of
	Military Aeranantics

General Mitchell, who was awarded the Dis-tinguished Service Cross on July 9, 1918, was then Chief of the Air Service, 1st Army, A.E.F. He enlisted as a private in May, 1808, and

served throughout the Spanish Way. He was appointed that Instrument in the Signal Corps, and the Signal Corps,

Kenly Now Colonel; Air Service Cut to Two Fields

Washington, D. C. March II.—William I. Kenly, formerly ehief of the lar service, with the rank of Major General, has been given have been given have been given have been given have been given been given been given been given by the service of the given been given by the given by the given given given by the given giv

Reorganization of the Air Service

Reorganization of the Air Service Washington, D. C.—A detailed attenent regarding the reorganization of the Air Service Wm. I. Kenle has been refleved of his rank as Major General his has been refleved of his rank as Major General kenle vecets to his ranks as Colonel in the Field Artiflers and has reported for duty to Wm. Mitchell, who was Assistant Chief of the Air Service, 3d Array of the Army of Occupation of Occupa

has succeeded General Neuly as Director of Miltary Accountage.

Charles P. Member. Director
of Art. Service, has selected and announced
orders in his said. They are as follows:
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Orders in his said. They are as follows:
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December of the said of

Officers Named Reserve Military Aviators The following named officers have been rated as Reserve Military Aviators: First Licutenant Donovan R. Phillips, A. S. A.; First Licutenant Joseph T. Higgins, A. S. A.

Officers Recently Dicharged

The following officers have recently been hon-orably discharged from the Air Service: Ist Lieut, John H. McCann, 1st Lieut, Morris E. Brown, 2nd Lieut, James A. McKnught, 2nd Lieut, William D. Baker, Major Ira B. Jorak-mon, 2nd Lieut, Harold Bottomley, 2nd Lieut, John H. Christman, Lieutenant Colond Hiram



Lieut, Beivin W. Maynard, who is credited with the world's looping record, having made 318 consecutive loops in 67 minutes

Bingham, Captain Thomas A. Box, 1st Lieut. Duerson Knight, 2nd Lieut. Clifford T. Wetherell, Captain Garland W. Powell, 2nd Lieut. George W. Sutton, Jr., 1st Lieut. John B. Shober.

(again Garland W. Powell, 2nd Lieux, Goorge Worthers, P., in Irane John B. Subber. Worthers, P., in Irane John B. Subber. When the Company of the Company of

Method in Paying \$60 Army Bonus Method in Faying \$400 Army Bonus
The War Department authorises the following
statement from the Director of Finance:
"Section 1406 of the Revenue Act, approved
February 24, 1919, authorizes the resyment of a
bonus of \$60 to officers, soldiers, field elerks and

narres of the Army upon homeshic enviration from active acrive by discharge, resignation or discretise. This beam is not appeal, to the active the control of the bount in rich appeal, the the control of the control o

Air Medical Service Determines Airmen's Special Fitness

Special Filtens
Washington, "Or rule 110 Myers accepted by
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The Bristol Monoplane, Type M. I. C., with Le Rhone engine



FOREIGN NEWS



Medical Aid to Aviation

Rome, Jasteh 11.—The first instralled medical aeromatical congress opened in Home.

The first instralled medical aeromatical congress opened in Home.

Resolutions desting with physical mod problemical tests applicable to candidates for pulse's liverance, the control of flights to high altitudes to candidates for pulse's liverance, the control of flights to high altitudes are considered in the control of flights to high altitudes of the medical profession in matters pertaining to aviation.

The United States was represented by Dr. L. G. Rountree of

London, March 13.—During the sur 6.000 enemy arrophants were obtained by the sur 6.000 enemy arrophants were stored by the sur 6.000 enemy arrophants were stored by the sur 6.000 enemy arrophants were stored by the sure of the sure of

N. Millisty Abreit for Germany
Paris, March 12, Most of Permitter Water Learning of German
German Companies of Companies Water Learning of German
German and Companies of Companies and Lo00 men to gather mines in the North Sea.

Company must deliver all the aerosphares to the Allies, and many companies of Companies o

First Duel in the Air is Arranged in Paris

First Duel in the Air is Arranged in Paris

Paris, Alz-The first serial duel in bistory was arranged to-day,
Capita, and I. 22—The first serial duel in bistory was arranged to-day,
Capita, and I. 22—The first serial duel in bistory was arranged to-day.
Nicuport single-seal machines equipped with machine game.
Their seconds, Oppsian Wadon and Pilot Babo, will take the air at
What canted the duel is not made public. The precise date of the
Consontra has not been given out, but it is expected to take place soon.

Paris, March 14.—The Paris police have taken a hand in the proposed aerial duel between Leon Vandercane and Robert Schreeber, former army avators. The prince gave two reasons shy the duel should not be endingered. The taken the proposed to be endingered. The taken the proposed to be endingered. It is suggested, however, that the aviators might had there dues to the proposed to th It is suggested, however, that the aviators might hold their duel over the seas.

British Authoritiss Arz Making Secret Experiments With tha Halicopter London, March 13. (Special Secret Experiments the Malicopter Archive Secret Secret Experiments with an apparates devicted to be embodied in a helicopter acroplane are being conducted secretly by authorities control Secret, in behalf of the Air Ministry, 100d the House of Common that speed far beyond any yet obtained by aircraft is claimed by spontons for a new type whose his being invasignation is claimed by a spontons for a new type whose his being invasignation.

Huge 1,000 Horse Power Air Ambulanca Tastad Paris.—A thousand horsepower aeroplane was tested recently as an inbulance, conveying surgeons, hospital equipment and wounded,



A Nieupoct Scout with twin Lewis guns and fixed Vickers gun

Belabevild Bomb American Lines.

Archangel, March 2 (by the American Lines). The Bolshevine took adventured to the American Lines and Lines an

Tunior March Aviter Files 1,100 Miles in 11 Heurs Landtre, March 11 trench Wireles Service,—Lentenan Lenattre, a bedieve March 11 trench Wireles Service,—Lentenan Lenattre, a bedieve Lenattre, and the service of Lipot kilometers (approximately 1,100 miles), in eleven boars actual Tiber Lenattre and a passenger left Tonlove at noon March 8 and landed at Casalhanca at 3 orlock on March 9. The shole voyage, from Tonlove to Advants, Sagan, and the second from March 12 or Casalhanca. The voyage from Tonlove to Casalhanca. The voyage from Tonlove to Casalhanca. The voyage from Tonlove to Casalhanca by ordinary means connunct in talky.

Buenon Ayres, March 10 —A new altitude record for South America was made on March 10 —A new altitude record for South America was made on Marchael 10 —A new altitude record for South America was made on Marchael 10 —A new altitude record for a period of the plant of the property of the

London, Marchael Landon, Planes to Belishworth
London, Marchael Landon, Landon Landon, Landon,

Derith Teas Attault Flight Arrangements Maturing to Condon—The ten flight across the Attaints of III be attempted as soon as favorable weather appears, by the Naval Branch of the Royal which is completing the mechanical equipment for a free both attaint, and the state of the Attaint Attaints of the Attaints of Attaints of the Attain

litriin, March 10. - Ilinge Gothbourning Banca were employed by the Government forces and the plantage of the Banca were employed by the Government forces and the Spartacities' revolution in Refin, to clear out machine gun nests on bousetops and to establish gun positions. A hattery, well concealed and delivering effective for against Government troops, was only destroyed after the air forces were employed.

Colond Briatow Saya 90 Passengar Plane is Under Construction in a speech before the Aldwech Club of London Colond Briator, construction which was designed to carry musty-one passengers in armchairs in rows of four. According to the Colond's statements, this guart questing armchairs are plane should be completed by this time.

British Aviators' Registry and Control of the British Aviators' Registry for pilots. According to the secretary of the British Avianors' Registry, Upper Baker Street London, there are orosen of line firms on the books of the British Avianors' Registry, Upper Daviation of the British Avianors' Registry, Upper Daviation of the British Avianors' Registry London, Upper Daviation of the British Aviators' Registry and Daviation of the British Aviators' Registry and Daviation of the British Aviators' Registry and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Proposed Control of the British Aviators' Registry for pilots and Propo

Dispite Makes Endurance Flight The British arrashy N S 11 succeeded in remaining four days four hours and rifty minutes in the air under the severe atmospheric con-Abertleen. The vessel carried a crew of ten officers and men, who were able to sleep in confort and when coaked, their metals me bands for the confort and when the coaked their metals me bands for the coaked their metals metals are some conformation of the coaked their metals metals are some coaked their metals metals are some coaked their metals metals are some coaked to be compared to the coaked to be compared to the coaked to be coa

Age. Transport for International Fostball Contestants.

But March 8 — Jour cerulates, piloted by Avistors Frantz, Garder,
Bedauny and Belmas, felt Villacondar, Science Grass, at 120 P. M.
on March 8 and arrived safely in Brussels at 340 o'clock. They
carried passengers also will see the international foodball game between
Helyum and France tomotrom. The French team will return to
France in the seroplants.

Society of British Aircraft Constructors a Permanent Organization Lendon—The Society of British Aircraft Constructors, born of war for the Constructors of the Constru



ELEMENTARY AERONAUTICS

MODEL NOTES By John F. McMahon



The Motorcycle Driven Machine

THE construction of the body is much the same as the body of the Ford Motored Aeroplane. The longerons from the nose to a point half way back are of selected ash wood ½7 square, from this point to the tail end are of spruce of in also ½7 square. They are then tapered at the ends for a length of 18 inches. The fir piece and the ash are then fastened together by host glue and wrapped with stilk then fastened together by host glue and wrapped with stilk or ribbon two plies.

runding two piles. The of spruce or fir in the rear of the piles seat and ash in from of the cockpit. All are 2^2 square except those under the centre panel wing struts, the engine struts and the compression struts to which the bottom wings but against. These are 2×1^2 and are diamond shape in cross section. That is the square edges are cut out to lighten without decreasing the strength to any great extent.

The body fittings that were in use on the other machine described can be used for this machine, as well as all the other fittings

The landing chassis is built up of ash straight grained 3 x 1" and stream lined except at the ends which are left square.

The wings are built up in the same fashion as the previous machine, but there is one thing that the reader must remember, and that is to make the ribs light. The webs should not be and that is to make the rios light. In the webs should not be over 3/16" thick, in fact it is better to have them neares 16", but a fair compromise would be \$5/22". The battens or straps along the top of the ribs must also be light. The dimensions for these should be ½6" scant by 5/32". Webs and battens should be made of clear spruce, but fir can be used for the webs if necessary. The weight of a finished full rib should be flour ounces. I have received eletters from readers who are webs it necessary. The weight of a ministed full fib should be four ounces. I have received letters from readers who are building the Ford Motored Machine and some of them tell me that their ribs weigh as much as six ounces. This is too much; the weight of the Ford rib must not go over five ounces at the most.

The principal thing to remember when making this machine is to keep all parts within the limit that I specify to insure the minimum weight being realized, which is necessary for successful flight.

The little half ribs should have only a batten and a former to hold it in shape along the top only. This half rib should extend to the front wing spar only, and is fastened to it by a little glue and a brass brad.

Ailerons are constructed the same as for the other machine. The aileron control arm is made of tubing also but it should only be five inches between the centre of the hole at the top only be five inches between the centre of the hole at the top to where the flattened part begins. When the Aileron is correct that the property of the propert

tened to the inside ribs first with tacks and cotton tape to keep the cloth from pulling over the tacks, then pulled tightly and fastened to the last rib from the outside tip of the wing. The cloth is then tacked along the entering edge. When this is

cloth is then tacked along the entering edge. When this is misshed the top and bottom coverings are folded over the imisshed the top and bottom coverings are folded over the property of the state of the state of the state of the Dope should then be applied. (Regarding "DOPE" have have been received asking what dope is and why it is used. The term "DOPE" is applied to the fluid which is ap-plied to the covering on aeroplane wings to fill the pores of the cloth which would otherwise allow the air to leak through as it were and of course the machine could not fly, and also to cause the covering to shrink, making it drum tight, which to cause the covering to shrink, making it drum tignt, winco in desirable to enable the wing to pass through the air cleanly, and the control of the control of the control of the control ounces, glicerine 6 ounces in a quart of water. This of course will not give the best results, but it was used in the old days in place of something better. Today many good dopes are on the market and I would refer the readers to the advertising columns, as many firms are advertising good dopes and aero-plane varnishes at reasonable prices, almost as cheap as the reader could make it up himself and many hundred per cent

As I started to say, the wings should be given two coats of dope, sand papering or rubbing with steel wool after the first

coal. When the two coasts of tope are applied the variash or a color should be applied. A color should be applied. It is not not until all the controls are fitted and in working order. Instead of making the control sitck pivoting on a rocking bar, we will have it attached at the botton end and free to move in any direction. The control cables will be attached at a point of 'from the bottom of the control cables will be attached at a point of 'from the bottom's control of the control cables will be attached at a point of 'from the bottom's cables will be attached at a point of 'from the bottom's cables will be attached at a point of 'from the bottom's cables will be attached at a point of 'from the bottom's cables will be attached at a point of 'from the bottom's cables. tom end. The Elevator cable passes around a pulley in front and then under the pilot's seat to the rear where it attaches to the elevator control arms.

(To be continued)

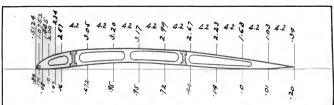
Wading River Manufacturing Company

The Wading River Manufacturing Company announces their new catalog, containing many new up-to-date models built to scale and driven by rubber bands. The models are sold in knock-down form and can be assembled by the average schoolboy by the help of a blue print simply gotten up, which helps

boy by the neip of a bine print simply gotten up, which neips in the construction of the model the Currisis JN-4B, Sopwith Triplane, Spad, Nieuport, Caproni, Biplane, Handley-Page, The De Haviland 4, that every American by loves to hear mentioned on account of its help in ending the war, and rac-ing models for those who prefer this type of machine.

The Wading River Company announces that they intend giving a prize in conjunction with the coming contests to the

giving a prize in confunction with the coming contests to the boys or men who purchase their parts from them. It would be worth the reader's trouble to get one of these new catalogs. The address of the Wading River Company is listed in the classified columns of this paper.



The U. S. A. No. 1 Wing Curve. The dimensions are given in decimal parts of an inch



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

John Peel Up to Date

(Airmen in their machines saw the sport from the sky, but though they 'viewed' the fox, the noise of the engines drowned their 'holloas'."—Daily Mail.)

D'ye ken the lads of the Velvoir hunt, Have you heard the tale of their latest stunt: How they brought their 'planes from the battle front And they flew with the hounds in the morning?

They were sportsmen all, they were blithe and gay, As they rose with the lark at the break of day; And they flew o'er the hills and far away With the Velvoir pack in the morning.

Oh, the wind was keen, and the engines sang, And the hill and dale to their shouting rang As their faces felt the joyous twang Of the frosty air of the morning.

D'ye ken the boys of the Belvoir pack? Old Reynard hopes they will not come back: For he quite forgot to double his track At their "yiew-hallo" in the morning.

AUBREY ENGLAND in Aircraft (London).



UNIFORMED BOYS BACK IN THE BUSINESS GAME Private Bosse saiutes Capt. Salesman, who gets down in the marning a trifle late (From the N. Y. World)

There was a young fellow named Payze, Who thought out the means and the wayze, In manner romantic, To fly the Atlantic,

And his name on the walls of Time blayze,

From Aircraft.

Sam: Look at that chap in that aeroplane. Shouldn't like to be up there in it.

Mike: I shouldn't like to be up there without it.

"Daddy, why do they call that airship a Blimp?"

"Because it looks like one."
"What is a Blimp, daddy?"
"Oh, eat your d—d bun and shut up."

First Hun: "How did der story of der Crown Prince's

rins run: riow did der story of der Crown Prince's death get aboud?"
Second Hun: "Because we a story circulated to throw dust in der eyes of hated England dot he in an aeroplane had escaped."

First Hun: "But there was no story circulated dot the

Pirist Hun: But there was no story circulated dot the plane had been lost?"

Second Hun: "No, but everybody who knew der Crown Prince thought dot if he in an aeroplane went up, he must haf died of fright."

A Scot persuaded a friend to take him up for a flip. In looping the loop he dropped a coin out of his trouser pocket. Later, while the two were flying over an ornamental pond, the Scot tapped the airman on the shoulder and shouted: "Let's awa' doon, mon; I can see ma saxpence."

The Village Blacksmith

(Revised R.A.F. Version) Under the spreading hangar roof

The sergeant-major stands; A fierce, imposing mouster he;
All quake at his commands,
And the thunder of his booming voice
Is worse than German bands!

His hair is cropped beyond recall, His face is like a boot; His brow is wet with thoughts of debt Incurred when a recruit. He looks nobody in the face

(If so, they'd have to scoot!) He goes at midday to the mess

And sits among the swells; Then drags defaulters by the neck And dumps them in the cells.

While his massive fists are tightly clenched Like those of Billy Wells!

Week in, week out, from morn till night, You can hear him curse the day When he started on his maiden flight And a beastly strut gave way,

When (according to his own account)
He was foremost in the fray! Strafing, abusing, bellowing,

Stranng, abusing, bellowing,
Onward through life he goes,
Each morning he contrives to add
To many an A/M's woes.
Something attempted, someone "run,

Will earn him a damaged nose!

G. R. S. in The Olympian.



Vol. 9, No. 3

MARCH 31, 1919

10 CENTS A COPY



A remarkable photograph of the Handley-Page Bomber which successfully flew from Elizabeth, N. J., to Ellington Field, Texas

\$30,000 Cash Prizes and Trophies for Atlantic City Aerial Contests





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Contractors to
H.M. GOVERNMENT.



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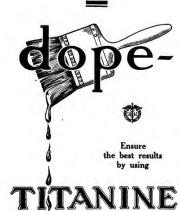
Telegraphic Address: Vickerfyta Knighta, London





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on





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Manufacturers of

Aeroplane Dope Finishing Varnish
Pigmented Varnish Identification Colors
Planoline Fireproofing Solution
Dope Resisting Paint



Vot., IX MARCH 31, 1919

No. 3

PACE

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NEIL MacCOULL, M. E. Absent on Naval Se Contributing Technical Editor H. B. CHILDS

THE NATIONAL TECHNICAL, ENGINEERING AND TRADE AUTHORITY

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VOL. IX

NEW YORK, MARCH 31, 1919

NO. 3

\$30,000 CASH PRIZES AND TROPHIES FOR ATLANTIC CITY AERIAL CONTESTS

COLONEL BISHOP OFFERS "ACE OF ACES" TROPHY

HIRTY thousand dollars in cash prizes and trophies has already been offered for the Atlantic City aerial contests which are to begin on Saturday, May 3rd.

Harvard Has Made Two Entrees Yale University to Compete

The Harvard Aeronautical Society has notified the Aero Club of America that it will enter for both the seaplane and landplane intercollegiate contests. Yale University is to com-pete and is developing plans to that effect. Other universities are summoning their aviators and balloonists and half a dozen entries may be expected within a week.

Colonel Bishop Offers "Ace of Aces" Trophy

To encourage the development of aerial navigation and to of encourage the development of aeriai havigation and to stimulate aerial sport between Canada, his native country, and the United States, Colonel William A. Bishop, British Ace of Aces, has offered, through the Aero Club of America, an international trophy for annual competition.

international trophy for annual competition.

The trophy presented by Goined Bishop is to be known as the control of the contr

an unofficial record of over 100 enemy machines.

an unofficial record of over 100 enemy machines. He is now the Honorable Aide de Camp to the Governor General of Canada, and has been decorated with the Victoria Cross, Divinguished Service Medial, Military Cross and Dis-tract Club of America. He had in his squadron three Americaas, of whom he says "they did themselves proud I can tell you." They were Sprigs of New York, who got fifteen machines; Grider, who was killed; and Callahan of Chicago, who downed ten Huns. Colonel Bishop is particularly interested in developing speed

contests and bringing closer relations between Canada and the United States.

Atlantic City Aero Club Offers \$10,000 for First Trans-Atlantic Flight

The Atlantic City Aero Club has offered a cash prize of \$10,000 to be awarded to the pilot of the first aircraft to fly source to be awarded to the pint of the first ancient to silver the Atlantic, which starts from or terminates at Atlantic City during the month of May. The general conditions of the Law Competition are approximately the conditions of the Daily Mail \$30,000 prize. Entry blanks can be obtained from the Secretary of the Aero Club of America, 297 Malsson Avenue, New York, or from President Albert T. Bell, of the Aero Club of Atlantic City, New Jersey.

Contests for \$5,000 Additional Prizes to be Announced

A contest for \$5,000 additional cash prize is to be announced within a few days. The details are being worked out as AERIAL AGE goes to press. The prize will be for land aeroplanes.

The contests, which are sanctioned by the Contest Committee of the Aero Club of America, under the rules of the International Aeronautic Federation, which govern all aerial contests, are as follows:

The Valentine Weekly Efficiency Marine Flying Contest

The prizes (awarded under the terms of the Samuel H. Valentine will) are to be awarded for the greatest number of laps covered in flying over a 60 mile course with the Steel Pier, Atlantic City, as starting point and Cape May Naval Air Station as turning point, during the five Saturdays of the Convention:

First Prize		ı					ı			.\$1	.000
Second Prize					i						500
Third Prize			,								250
Fourth Prize											100

The race is to start at 10 A. M. and last until 5 P. M., each of the five Saturdays in the month of May The laps start and end at the Steel Pier. Only complete laps count.

Curtiss 1,000 Miles Non-Stop Seaplane Contest

Mr. Glenn H. Curtiss has offered a prize of \$1,000 to go to the first entrant for the Curtiss Marine Flying Trophy who covers the distance of 1,000 miles without stopping. The contest for this prize will open on May I and continue until it has been accomplished.

nas been accomplished.

The entrants who wish to compete for this prize during the Convention can fly over the 60 miles course between the Steel Pier and Cape May Air Station, and can compete for the Valentine Efficiency Marine Flying Prizes at the same

The entrant's record will be counted as a flight for the Curtiss Marine Flying Trophy under the rules for the 1919 competition for this trophy.

Open Seaplane Speed Contest (with handicap)

for 42 laps of 5 miles each. To be held on Decoration Day, May 30.

First I	rize										. \$1	
Second	Prize	٠.										500
Third	Prize.						٠					250

148

Aerial Commuting Prize

(1) To be awarded to entrants who cover the greatest total distance in commuting by air from anywhere to Atlantic City during the period of the Convention.

Second Prize......Silver Medal Third Prize Bronze Medal (Distance to be measured in straight line.)

(2) To be awarded to entrants who make the greatest number of trips in commuting by air from anywhere to At-lantic City during the period of the Convention.

> Second Prize......Silver Medal Third Prize.....Bronze Medal

(3) To be awarded to entrants who make the longest flight in commuting from anywhere to Atlantic City during the period of the Convention. (Distance to be measured in straight line.)

Second Prize......Silver Medal Third Prize Bronze Medal

Army, Navy and Marine Corps Contest for Accuracy in Bomb Dropping on a Floating Target

This contest is to be held every Saturday during the Convention and on Decoration Day.

Both land machines and seaplanes are permitted to com-pete, but slow machines must fly higher than fast machines, to equalize the chances of hitting the target.

> First Prize......Gold Medal Second Prize......Silver Medal Third Prize Bronze Medal

To enable the hundreds of thousands of college men who were in the Army and Navy and Marine Corps Air Service but have left the service, to continue their training in aero-nautics, both as a measure of national preparedness and as a means of facilitating their remaining in the aeronautic movement, the Aero Club of America and the Aeria League of America have arranged to hold a series of intercollegiate tournaments at Atlantic City during the coming symmer.

The first of these intercollegiate contests, which are to be held in May, are as follows:

Intercollegiate Seaplane Speed Race

Over a five mile course, for the \$2,000 Intercollegiate Trophy. This event is open to graduates and under-graduates whether in military or civilian life.

Dirigible Speed Contest (With Handicap) For the Aerial League of America Silver Trophy

This contest is open to Army, Navy, aero clubs, colleges Ihis contest is open to Army, Navy, aero clubs, colleges and aeronautic organizations, il will be held on the alter-and aeronautic organizations, il will be held on the alter-life. Statioday, May 24; Friday, May 30, and Saurday, May 31. Each member of the wiming crew of each race will receive a silver plaque of the trophy.

The names of the members of the winning crew of each

race will be inscribed on the trophy, which is to be competed for annually.

The race will be for the speed (under conditions of the handicap) made at each race. After these events are over a few weeks will be allowed for

preparation and then the following contests will be held:

Three Months Intercollegiate Seaplane Tournament This will be an intercollegiate seaplane tournament to last

three months. The contests will be held every Saturday, and the college holding the largest number of points at the end of the month, each month, will be considered the winner for that month. The second best the second; the third best the third. But the final winner will be the college which has the largest

number of points at the end of three months.

Each college will be permitted to have three entries. The pilots may be changed weekly, the change being left entirely to the discretion of the college which has made the entry.

This plan will permit the testing of a number of collegiate aviators and finding the best. It will also give an opportunity to a college which may have had a very low number of points during the first and second months to catch up with the leader during the last month.

Three Months Intercollegiate Aeroplane Tournament

There will also be held a Three Months Land Aeroplane Race, to be governed by the same rules as stated above.

Three Months Intercollegiate Dirigible Tournam

To provide for practice with dirigibles and give opportunities to college men to participate in the development of this wonderful and most progressive branch of aeronautics, there will also be held a Three Months Intercollegiate Dirigible Tournament, to be governed by the same rules as stated above.

The Aero Club of America and Aerial League of America authorities have been assured that the Army and Navy will be glad to co-operate and permit Army and Navy officers who are dirigible balloon pilots to represent their respective colleges in the dirigible balloon tournament.

Three Months Intercollegiate Spherical or Kite Balloon Operating Tournament

In view of the fact that, owing to the nearness to the Atlantic, it would be impossible to hold free balloon races from Atlantic City, plans have been made for holding the Intercollegiate Free Balloon Races elsewhere in the latter part of the Summer. To afford training to college men in the operation of balloons, there will be held a Three Months Intercollegiate Balloon Operating Contest, to be governed by rules similar to the rules for the seaplane tournament.

The contest will consist of the important work of lay out the balloon, inflating, and send it up, with two or more men on board, who will take observations and communicate with the people on the ground by telephone,

The trophy will be awarded for the speed and efficiency in laying out, inflating, and sending up the balloon, as well as for the work of the men on board.

Provision is being made at the Atlantic City Aviation Field for housing the land planes and balloons. Arrangements are also being made for housing and taking care of the seaplanes. Provision will be made for experts to look after the aircraft used for the intercollegiate races, and every facility will be given so that undergraduates, as well as graduates, can compete in the May contests with a minimum loss of expenditure of time.

Great enthusiasm has been aroused in intercollegiate circles by the announcement of these intercollegiate aerial contests, and it is expected that the entries will be numerous and the events will be of great value to the nation, and will be a means of keeping up the development of American aeronauties as well as giving an opportunity to college men to participate in the program of acronautics.

United States Army, Navy and Marine Corps aviators and balloon observers, in the Service or out of the Service, who wish to compete with the teams of their colleges or to start teams, should apply to Mr. Alan R. Hawley, chairman, Contest Committee, Aero Club of America, 297 Madison Avenue, New York City.

An international contest in which the Allied aces already in this country or on their way over would compete, is being considered by the Contest Committee of the Aero Club of America, which includes the following prominent military and civilian authorities in aeronautics and intercollegiate sports: Alan R. Hawley, Chairman; Lieut, Com. P. N. L. Bellinger, U. S. N.; Col. G. C. Brant, U. S. A.; W. Redmond Cross, Lient. Godfrey L. Cabot, U. S. N.; Walter Camp; Col. Milton F. Davis, U. S. A.; Col. C. de F. Chandler, U. S. A.; Major A. B. Lambert, U. S. A.; Major William McIlvain, U S. M. C.; Col. James Prentice, U. S. A.; Major J. C. McCoy, U. S. A.; Com. H. C. Mustin, U. S. N.; Lieut, Com. John H. Towers, U. S. N.; Henry A. Wise Wood and Henry Woodhouse,

TRANS-ATLANTIC FLIGHT AN INTERNATIONAL RACE

A last the flight across the Atlantic is to be made. The certainty that it will be made is supplied by the fact that the four great nations, France, Italy, Great Britain and the United States are to try it almost simultaneously. Some of the trans-Atlantic flight plans which have been secret for a number of months are being announced in such swift succession that all of a dozen such plans will be made public before Arana. And leaves the presess.

The plans made public at the time of going to press are as follows:

Lieut. Commander Patrick N. L. Bellinger, until recently commandant of the air station of the Naval Operating Base at Hampton Roads and the 5th Naval District, will pilot the United States naval seaplane that will attempt to cross the Atlantic Ocean.

Lieut. Commander Bellinger received official notification from the Navy Department to come to Washington for a conference before attempting the flight.

He declared that he did not know just when the start would be made, but thought it would be as soon as there was reasonable likelihood of favorable weather setting in with the approach of spring. He said he did not have any doubts as to the final outcome unless the elements interfered. He felt confident that the light would prove successful.

Lieu, Commander Bellinger is considered to be the Navy's best aviator. He has made some remarkable flights to sea and his general knowledge of all makes of flying machines won for him the command of the largest aviation unit in the Navy during the war. He stated that he did not know where the flight would start from, but it is said in naval circles that Hampton Roads has been selected and that the route would probably be from here to Bermuda, about 800 miles, thence to a point on the Irish coast, about 1,600 miles.

Lieu. Commander Bellinger has been conducting experimental flights for the last two weeks. It flet we several hundred miles to sea a few days ago and picked up a speeding destroyer which had several hourt's start on him. This experiment was conducted to familiarize the aviator with the lane followed by steamships in crossing the Atlantic Ocean. Other experiments have proved, naval experts say, that Bellinger is the logical man to attempt the flight for the American Navy.

Captain Roy N. Francis of the Army Air Service has been placed in charge of the Army's attempt. He pins his faith to the land type of machine, and it is rumored that a special machine is nearing completion at the Glenn L. Martin factory for this effort.

On March 21, Captain B. B. Lipsner, former Chief of the Aerial Mail Service, announced that Captain James V. Martin had placed at his disposal the newly perfected Martin machine, in which Lipsner says he will attempt a trans-Atlantic flight.

Captain Lipsner says he will take the Azores route, following the same course taken by President Wilson in the George Washington, and that he hopes to start in a week if arrangements can be perfected whereby the Navy Department will picket the route.

The Lunstedt-Hauning machine, constructed by the Witteman-Lewis Company, has undergone several tests recently and Capt. Hugo Lunstedt hopes for an early effort at the Atlantic trip.

The British Efforts

The British plans so far announced include two efforts with land machines, one with a flying boat and one with a large dirigible. A secretly built aeroplane, accompanied by Harry G, Hawker, as pilot, and Commander Mackenzie Girve, Royal Navy, as navigator, was shipped from England on March 18 to St, John's, N. F., whence it will start at the earliest possible moment in an attempt to win the Daily Mail prize of \$50,000 for the first machine to fly across the Atlantic.

The machine is a Sopwith two-seater biplane, with a 375 horse power Rolls-Royce engine.

Pilot Hawker said he believed the flight would occupy about nineteen and one-half hours. The machine, he added, had flown 900 miles in nine hours and five minutes on one-third of its petrol capacity, and is capable of maintaining a speed of 100 miles an hour for twenty-five hours.

Hawker was the British Michelin Prize for 1912 by a continuous flight of eight hours and twenty-three minutes. He has made many loug distance flights along the British the many lough distance flights along the British of the many lough the structure record of 25,500 feet in 1915. Newton along the third the record of 25,500 feet in 1915. Newton along the third of 25,000 point to Europe, involves a flight of about 1900 miles. Aviator Hawker is an Auptralian and is considered well qualified for the attempt.

The flying boat "Porte," which is named after Lieut. Col. John C. Porte, who designed it, has been shipped on a vessel across the Atlantic for the purpose of making from Newfoundland what may be practically described as the British official attempt to fly over the Atlantic.

The Porte machine comes from the Government workshop, and will carry the hopes and blessings of the Air Ministry. The Porte boat, as illustrated on another page of this issue is the largest flying boat so far constructed by the British Air Ministry.

A British supertriplane, which will probably prove to be the biggest acroplane in existence, is slowly nearing completion. The London Chronicle learns from one of the officers concerned in its construction that the machine was originally commercial use; and is expected to make its first flight under control of Captain Dinnier at an early date. Its capacity is enormous, and, although the inside periol tanks will limit the number of passengers to fifty, future machines may carry as 100. Reports state that the machine is a product of its displace to the designers is a flight across the Atlantic.

Great Britain's biggest airship, the one with which an attempt to fly across the Atlantic is to be made shortly, rose for her first trial flights on March 19.

Swaying gently in a strong head wind she rose immediately and at 300 feet started eastward at seventy miles an hour.

Some months ago the British Admiralty placed orders for similar ships with two large contracting firms—Beardmore, on the Clyde, and Armstrong-Whitworth, at Barrow-on-Eurness. The latter won the strenuous race to be first in the air with the R-33.

The airship, which is of the rigid type, was constructed for war purposes, the sinister indications whereof are manifested by openings in the underbody through which can be dropped four 800 pound and sixteen 120 pound bombs, and by provision in the upper works for eight guns.

The slip carries gasoline for an eighty hour flight at an average speed of sixty miles an hour. There are five twelve clinder engines of 250 hovecpower each. One of these is clinder engines of 250 hovecpower ach. One of these is called the control of the contro

The French Efforts

It is known that the Farman Company is working on a large type of land machine for entry in the traus-Atlantic journey. Nothing has been divulged concerning the details of the machine, but it is regarded as possible that it will be similar in type to the "Aerobus" which this company recently flew with passengers from Paris to London.

The Italian Efforts

The well-known Italian inventor Giami Caproni is constructing a huge triplane for the trans-Atlantic flight. It is said to be the largest machine ever attempted. When finished it is expected it will have facilities for carrying one hundred passengers. No definite date has been aunounced for the mittal text, but it is expected early this spring.



THE NEWS OF THE WEEK



Thomas-Morse Biplane in Fast New York to Ithaca Flight

Thomas-Morre Biphane in Fast New York to the Marchall and Carrying a reporter for the San as passenger, readed that et al. (18 to 18 to 18

the michines almost due north to overcome the drift. Dart Jerris, one hour stafer the start, the planes were still rusing, and a lettle later the planes were still rusing, and a lettle later the highest altitude of the trip, a lattle over 8,000 feet, was attained. Forty minutes later Lanceborn, Pa., was passed, "Text" Marshall kept once, Pa. was passed, "Text" Marshall kept was reached the dangerous part of the trip was over. The landing was made without difficulty. The second plane was compelled to descend at Blinghamton owing to led of gasolene.

Buying Dirigibles From England

Buying Divigiose from England Navy are purchasing non-rigid divigibles in England. One of these lighter-than-air craft, a new type in this country, has reached this country and will soon be put together. The Army is constructing a large hangar for such craft at Langley Field.

Aeroplanes to Combat Mexicon Bandita Aeropianes to Compail mexicon manufat Owing to the many attacks by bandist which have been made upon paymasters of companies operating in Mexico several organizations are preparing to have the payroll carried by aero-plane from the main office to the various field camps. Returned soldiers who have been in the flying service will act as polots of the machines. Whether this will entirely circumvent bandit raids on paymaners is a question. The re-sourceful Mexican bandit may decide to be as progressive as the companies themselves and take kindly to the sport of bunting paymasters with anti-aircraft guns.

Transatiantic Telephony Fcom Belmar to Brest and Glace Bay to Carnarvon

and Glees Bay to Carnarvoe
Washington, "Wireless telephone messages
were sent daily to the President's ship, the
and the voice of the apselar was clearly heard
when the ship was at anchor at Brest, according to mavel deficials. The Belant Transatlantic
and New York of the present of the Areas of the
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Art the same time, wireless telephone communication was successfully ceabalished between
Glees Bay, Nors Scotta, and Cararvon, Wales.

17th Aero Squadron Doweed 65 Enemy Plane

17th Areo Squadron Doweed 60 Enemy Planes New York, Ny.—The 137th Areo Squadron commanded by Lecuteman J. T. Heckel, of Major S. B. Eckent of Philadelphia, returned aboard a transport late in March. The 17th Philadelphia, returned aboard a transport late in March. The 17th Philadelphia, returned aboard a transport late in March. The 17th Philadelphia, returned aboard a transport late in March. The 17th Philadelphia, 17th Philadelphia, 17th 17th 17th Philadelphia, 17th 17t

Senator Henderson Uses Air Route

New York, N. V.—Senator Charles B. Hender Charles

General Crowder Flies to Duty ot Havas Havana.—Maj, Gen. Enoch F. Crowder, Judge Advocate General of the American Army, who Advocate General of the American Army, who revise the election laws, a rived at Havana Iron Key West by scaplane. After landing, General Crowder went aboard the American criviser Cin-cinnati. The plane carrying General Crowder was secorted by another plane. Col. Blahop Ill

Col. Bishop III

Roanoke, Va.—Col. William A. Bishop, la
mous Canadian aviator, was operated upon for
appendicitis here. He was stricken as he was
preparing to deliver an address. If is condition
was reported to be satisfactory.

was reported to be satisfactory.

Baltimore Md.—William Bl. Logue, Jr., in Baltimore, has a check for \$1,000 which he wants a deposit as a sarrer on a fixed of \$100 million of

Wahington, D. C.—The War Trade Bords and Marketter and the Marketter and articles until the Marketter and articles until the Marketter and the Marketter and

Augustus Post Enthusiastic Over Future of Aeronautics Arenawite

Albany, Mart 21—Consumazion of a transference of transference of the second of the



Congressional Committee new in Europe to study aircraft problems. From left to right: W. R. Green ol lews; A. T. Smith of Idaho; W. Ashbrook of Ohio; John E. Baker ol California; C. W. Ramsayer of lows; Burton L. French ol Idaha; and Hatton F, Summers ol Texas

Mr. Post told of a device now mear perfection were an area of many thousands of square miles. They have been experiencing successfully ready to be connected they will be hadden ready to be connected they will be hadden can be fitted up for piesawic artists and with a classification of a freat 2000 miles. These dirighter can be fitted up for piesawic parties and with a classification of a freat 2000 miles. These dirighter can be fitted up for piesawic parties and with a central section of the piesawic parties. The control of the piesawich proposes, the directed that solution a few perisa there will be custabilished mail and parameter contacts from this country to Europe.

routes from this country to Europe.

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Interallied Commission Favare Adapting Ma-rine Rulas for Aircraft
1t appears probable that all air vessels will have to ober rules similar to those laid down for mari-time shapping, according to a dispatch to the New York San.

In appears probable that all art vessers win ascrime in the common shaping, according to a dispatch to the New York Jan.

The probability of the completed to the completed of the completed to the completed of t

if flying is prominted users obeyed. The possible outcome is that the Allies will take a major lense on all commercial aerual lines as a major lense on all commercial aerual lines as a major lense on the flying on n large scale for a certain period. Such an agreement would necessarily have to be clause in the peace treaty.



Lient.-Commander Patrick N. L. Bellinger, whn will pilat the Navy Flying Boat in the Trans-Atlantic Flight

and their present address, to which they desire their bouns check to be sent, will be presented to the nearest recruiting officer of the Army, who will make and sign a certificate in the margin on the back of the original discharge paper in ink, or stamped with indelible ink, reading as

Indians. "A true copy of this discharge certificate has "A true copy of this discharge certificate has the control of the co

Senator W. B. Henderson to Tsha First Flying Lesson Up in the Air With a United States Senator as the first pupil, a new system of teaching pleasure flying without months of preliminary groundwork, physics and



Harry G. Hawher, whn will attempt to Atlantic flight in a Sapwith land machina

chemistry, hitherto required of all aspirators for a placin letters, will be treed out at Bolling Seriator II. B. Henderson, of Nevada, who re-produces the serial between the serial be

Flighty Musical Comedy By Ruckaway Airmen Flighty Musical Consely By Rankaway Airmos Naval aviation of the station of Rochaway syncopated sature in three acts," called "litelia ledow. It was written by Emiga Vaughin the Rockaway Form station, It deals with the training of airmet. The boys bape for a battan if the show makes a bit in Rockaway, where the first performance are booked.

Eddie Stinson Tasts Aca Plane Eddie Stinson Tasta Ace Plane

Ver Virsk, March 25.—Boldie Stinson Artest

ver Virsk, March 25.—Boldie Stinson Artest

Engineering Corporation of New York at their

brid at Crastal Park, L. I., to determine if the

intie machine would meet his requirement for

easy climbing urus, and after trying the controls,

performed a series of hair-raising stunts in the

intie machine.

Bureau ni Minas Studied Aircraft Fuel Problem

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Transport Ariznnan Bringa Hnma Twelva Aero

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Caswell Predicts European Demand for U. S.
Parts and Accessories
Never at the Construction of the Construc

Plug Co.

The conditions which have practically ex-cluded European competition during the last two years have placed in sin a Javorshia posi-tion of the world's trade in many of our most im-portant commodities. But it should be borne in mind that the circumstances under which we have lately made such gigantic strides as an



F. B. Caswell, sales manager of the Champion Spark Plug Co.

exporting country will soon cease to exist and will be followed by a period of competition such as the world has never before known.

as the world has never before known our pack-free quality of our products and of our perc-sentatives—will all be pitted against the best that can be developed by those who, for cut turies, have studied the art of cultivating good Anglo-Saon, Testionic and Latin peoples of the old world are going to relinquish their hold oppositions of the product of the con-position of the control of the con-trol of the con-trol

spon those markets without a struggle. The principles of quantity production which form the keynete of our success are no longer sea. The esperience gained by the entent countries during the last two years of the war advantages of scientifically worked-out reduction methods—at which American manufactures have that in order to successfully compete in many lines we will have to be natisfied with a small margin of profit.

To those who are interested in the namufac-ture of neveral accessors, the outlook is par-ticled to the property of the property of the manufactured and motors to Europe during the manufactured and motors to Europe When conditions get back to normal, there were the property of the property of the society of the property of the property of the things of the property of the property of the things of the property of the property of the the things of the property of the things of the property of the property of the property of the things of the property o

Personal Pars

Charles M. Manley, president of the Society of Antomotive Engineers, has resigned as vicepresident of the Cartiss Aeroplane Corporation and returned to New York, where he will con tinue the development of the Manley hydraulic

M. H. Blank has been appointed chief engineer of the Lynite Laboratories of the Aluminum Castings Co., Cleveland. He was recently honor ably discharged as captain in the army. Previous to entering military service he was assistant engineer of the Premier Motor Corp.

Standard Parts Now in Own Building Cleveland-On the first of the month

Standard Parts Co. moved from its central offices, which include the executive and supervisory staff, bookkeeping, advertising and contracting departments, to the Standard Parts Building on Walnut Avenue at East Eleventh Street, which has just been completed.

Aeronautic Committee Sails for Europe Washington-A Congressional committee to study aeronautics in Europe has sailed with Secretary Daniels. The committee comprises W. R. Green, Iowa; A. T. Smith, Idaho; W. A. Ash-brook, Ohio; John E. Raker, Cal.; C. W. Ramseyer, Iowa; B. L. French, Idaho, and H. W. Sumner, Texas.

Aluminum Ceatings Co. Makes 18-Cylinder Rotary Motor Casting

Fairfield, Conn. - An exceptionally difficult piece of casting work was turned out at the Fairfield plant of the Aluminom Castings Co., under the personal supervision of Mr. J. F. Deiter, the plant manager for the Tipps Motor Co., of Woonsocket, R. I. Thia is an 18 cylinder rotary motor of radical design, described in the March 17 issue of Agatal Age. There are 26 ribs on the end of this casting and 15 on the side, the ribs being 136 inches high and 3/16 of an inch thick. The castings were 48 inches in diameter and 171/2 inches high. The total

weight, ready for shipment, ia 585 pounds Mr. Tipps informed Mr. Deiter that the castings he turned out were superior to the products turned out in the Belgian factories, where Mr. Tipps made his earlier experiments.

J. G. Uta Chief Engineer for Standard Parts

Department of the Standard Parts Company,

has been one of the moving spirits in standardi

Mr. Utz is a Corneil graduate and began his practical training while attending college, work-ing one summer for Mr. Elmer Sperry on his

After graduation Mr. Utz became chief draftsman for the Olds Motor Works. Before

leaving this concern he was promoted to the position of assistant engineer. In 1907 Mr. Utz joined the engineering forces of the Autocar Company and designed the truck which is still

sation in the automotive world.

tric car.

John Gilmore Utz, director of the Engineering

J. G. Utz, chief engineer of Standard Parta Co

n modified form being manufactured by that company.

company.

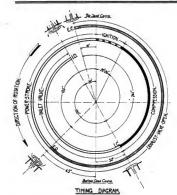
At a later date Mr. Utz designed the light weight Chalmers Thirty, which was at that time one of the largest selling cars on the American market. Following this, Mr. Utz was identified with the Abbot Motor Company and the Perfection Spring Company.

the Perfection Spring Company, Early in his career Mr. Uts became interested in the matter of standardization, being identified of Licensed Automobile Monafecturers, which concerned itself with the standardization of continued by the Society of Automotive En-generic and has often been mentioned in the many continued by the Society of Automotive En-generic and has often been mentioned in the Mr. Utz was successiver a member of the Mr. Utz was successiver; a member of the

gineers and has often byen mentioned in the Mr. Ut was successively a number of the Causell and Chairman of the Standard Communic and Chairman of the Standard Communic in contact with prevenuestal activities, when, upon the declaration of the war, the deof the large and surgest understains. Mr. Utt. 1927, and in December of that year was made suppristor of commercing also, the fer experted the surgest of t



A remarkable casting made for the Tips Motor Co. by the Aluminum Castings Co.

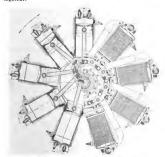


are interchangeable. The inlet valve guide seating is screwed into the head of the cylinder. These valves are brought back to their seats by very light springs, which ensure their operating when starting up; when up to speed, centrifugal force brings them back to their seats. The valve rocker operates alternately, the inlet valve and the exhaust valve, by reason of its oscillating motion in the valve rocker tea piece which is fitted with ball bearings. On his rocker is faced a lever operated to the contraction of the properties of the properties

Connecting Rods and Platons

The connecting rods are connected to the crankpin by the connecting rod thrust block, which is made in halves running on two ball bearings mounted on the crankpin.

on two sances may be mounted in the Yangu, esh set being of differences is three comments good ones. In the work of the comments good ones to the comments which are provided in the connecting rod thrust block. This arrangement allows the connecting rod thrust block to rock relatively to one another. Xine screws hold the halves of the thrust block together.



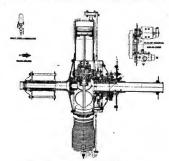
Rear diagram of the 110 H.P. Le Rhone Mote

The pistons are of aluminum fitted with two phosphor bronze bushes. The gudgeon pin is of the floating type and is prevented from rubbing the cylinder walls by means of two circlips, which are fitted into grooves in the bushes. There are five piston rings which are of special steel.

Valve Mechanism

The valve mechanism consists of two cams, one induction cam and one exhaust cam operating into cam rockers, each connected to its valve rod. The rockers receive oscillating motion caused by contact of the induction cam rollers and the exhaust cam rollers on their respective cams. It will be seen that centrifugal force acting on the valve rod will tend to keep that centrifugal force acting on the valve rod will tend to keep its very important, and the value of it will be understood in connection with the setting of the valve timing. A cam is fitted on each side of the cam boss which is free to rotate upon the ball bearing mounted on the crankshaft. On the back cover is bolted a gear wheel having 54 teeth, which is in meak with the came of the control of the cont

The profile of each cam is repeated exactly five times round



Side view diagram of the 110 H.P. Le Rhone Motor

the periphery. This profile combined with the eccentricity and the centrifugal force of the valve rod gives the nine rockers the necessary motion at the moment of opening and closing the valves.

ignition

To the main bearer plate is attached the magnetos, the prinon (16 teeth) of which is driven by a gear whele which is contact his driven by a provided in a contact his dress of determining the magnetos provided in the contact his dress of the same for all the cylinders. A high tension wire conducts the current to the brash holder, which is also fixed on the main bearer plate.

The brash in the brash holder works on the surface of the

The brush in the brush holder works on the surface of the distributor, which is fixed to the back cover and has nine separate segments. A bare brass wire is carried from each of these segments to the corresponding sparking plug fitted to the cylinder.

estimater. Referring to the order of firing in the cylinders given in Paragraph II, it will be seen that the distributor must only transmit the current alternately and in the order 1, 3, 5, 7, 9, 2, 4, 6, 8, each point of ignition corresponding to the moment when the platinum points of the magneto separate.

Lubrication

The oil pump previously stated is fixed on the main bearer plate the spindle of which carries a pinion also driven by the gear wheel fixed to the back cover.

The worm is cut in the center of the oil pump spindle which drives the worm wheel mounted on the oil pump crank(Continued on page 177)

SAND TESTING OF AEROPLANES

By ALBERT S. HEINRICH

URING the last year of the War the United States and foreign Governments spent millions of dollars in sand signers to determine their structural strength, and correctness of design. Owing to the many different methods of analyzing

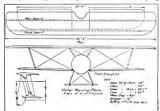
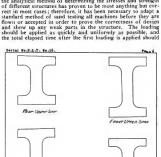


Figure 1-Three views of the wing structure, together with the

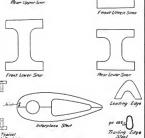


Figure 5-Machine set et proper inclination, ready for application of sand

the stresses in an acroplane, and also the different type trusseemployed in acroplane design, it has been practically imposible to adapt any one type of truss and apply it to all types of machines, as what proces most satisfactory for one machine will be very unsatisfactory for another, and alof machines here more of less standard all over the world.



the past year has shown some radical changes in design, and the analytical method of determining the stresses and strength



Victor Training Plane
Sections of Wing Structure
Figure 2—Sections of wing members and one of the large strute

not take more than two hours, as the time element is often the leading factor in determining the ultimate strength of the structure, as material fatigue from keeping the members stressed and strained too long will often give misleading

The following tests were conducted at McCook Field, Dayton, Ohio, on the Victor Advance Training Plane, shown in Photos 1, 2, and 3.

General Description and Dimensions

The Victor Aeroplane, built by the Victor Aeroplane, built by the Victor Aircraft Corporation, Freeport, Long Island, is a single-scated training hiplane, equipped with either a 100 H.P. Gnome or a 90 H.P. Le Rhone makes 115 m.p.h., and with the Le Rhone II of m.p.h. The total weight with the Gnome motor is 12.28 lbs., and with the Le Rhone motor. Figure 1 shows three views of the wing structure, together with the language chassis, which connects the lower are two spars in each wing.



Three-querter front view of the Victor Advance Training Plane

interplane compression members consisting of single struts with large column heads, connected to both spars, thereby reducing the parasite resistance considerably. The full-size section of one of the large struts is shown in figure size section of one of the large struts is shown in figure 2, and the upper end of one, after failure, may be seen in figure 8 showing the sheet seed end and details of other parts of the structure. The ribs are of very light construction, having plain webs, reinforced by thin strips of fibre fastened by wire staples to each side of the verticals, as shown in figure 3. Full-size sections of ribs, spars, and two edges are durant in figure 2. Figure 8 alia shows a part of one of the single-control masts operating each aileron. This mast has two long arms on the lower surface of the



Figure 3-Typical Rib, upper wing

aileron, and the cables pass from the ends of these arms through the lower wing to the fuselage, thus giving a simple, strong control system.

The following is an abbreviated weight schedule	
Body complete	208
Empennage	. 24
Landing Chassis	. 51
Lower Wings	45
Upper Wings	70 32
Interplane Struis	3.2
Motor, Cowl, Prop. etc	320
Pilot	165
Fuel and Oil	150
Total	1,065 11

Stop A Stop 4		1	To La Co	S No.	143		-
	-04	172-00 84	- C LONGED	Cate 2:02 (c)	Ansa Me		
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ar Soft S	4	M	1	A	H	10	Better
3	340	340	641	,		+ 3	8064
3.6	+00	#00	810	4.	. 4.	.1	2018
4	460	94.0	441		44	244	11.12
00	120	360	000	00	40	1790	40-
9	26.2	*90	2.0	1.7	**	200	4480
56	640	640	100	.61	41	150	1 4949
	7,10	700	410	4"	471	200	200
		1 20	594	78	79	1908	1885
4.5	700						
4.6	180	9.82	+90	**	7.0	090	4550
			140	18	10	103	1000

Table 1-Tabulation of loads applied to wings as shown in Figure 5 General Dimensions and Areas

Area, upper	wing26' 0" wing99.5 sq. ft.
Chord, upper Weight, per	sq. ft., 705 lbs, sq. ft.
with aile	rons

Span, lower wing. 22'0"
Area, lower wing. 63 sq. ft.
Chord, lower wing. 42"
Weight, per sq. ft. 715 lbs. sq. ft.

with aileron cables Mean gap...... 48" Angle incidence...+ 1° w i t h

prop. axis Weight, per sq. ft.. full load 6.56 Pounds, per H.P.... full load 11.85

this purpose. Incidence wires are done away with in this design, being replaced by the rigid struts.

Procedure of Wing Test

The general formulat for deter-

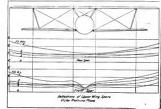


Figure 4-Deflection curves of wings during test shown in Figu

Wg = gross load

Ww = weight of wing truss complete

n = any factor of rapidity

If the machine is a Biplane, and the Gap/chord < 1 one sq.
ft. of the lower wing is taken as equivalent to 8 sq. ft. of

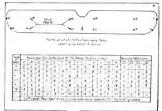


Table 2-Tabulation of deflections and retreat for the different

the upper wing and, where the Gap/chord < 1 one sq. ft. of the lower wing is taken as equivalent to one sq. ft. of the upper wing, and the general formula for determining the load per sq. ft. of the upper and lower wing, respectively, when the Gap/chord < 1 is:

W = AuX + AL 8X W = Wg - Ww

W = Wg - Ww
Au = Area upper wings
Ai = Area lower wings
X = load per sq. ft. on upper wing
£X = load per sq. ft. on lower wing



Direct side view of the Victor Advance Training Plane



Figure 6 General view alter just failure in left lower rear wing span at a factor of safety of 6.5+

The distribution of load along the span of the wings, both upper and lower, is taken as uniform when the variation of the chord is not great; although this condition does not actually exist in the air, the error is not large enough to appreciably affect the final results.

The wing chord is divided into three parts of one-third, one-sixth, and one-half, from front to rear, respectively, with Wn Wn - on the front. on the middle, and on the rear

part; no sand is put on the trailing edge, so that this method of loading gives the C.P. between 1/3 and ½ of the chord from the leading edge. Det men the sassembled in an inverted position, and trued up carefully after it is set up in the stand. It should be placed on an inclination so that the chord line of the wings makes an angle of 14° to the horizontal. This method imposes the necessary draft load on the wings that a machine would get when coming out of a dive suddenly, which is the worst condition that exists in flying. Figure 5 shows the machine set at the proper inclination, ready

for the sand to be applied. The wings attached to the fuselage were supported upside down on two timbers cut to the contour of the veneer fuselage, as shown in figure 5. Loads were added as per table 1. and vertical deflections and retreat at the wing tips observed for each loading. Table 2 gives a tabulation of all deflections

1222

Figure 7-Close view of wing spar after just failure

and retreat for the different loadings, and figure 4 gives de-

The first failure occurred in the left lower rear spar, near the fuselage, as shown in photographs in figures 6 and 7, only the insetage, as shown in photographs in ngures o and , only the upper wing was supported by jacks while adding loads, the lower wing not being relieved of its load at any time. It is apparent from the front elevation in figure 1 that as only the flying wires are stressed during a sand test, no direct stresses can exist in the upper pars, but only beam action, which is not affected by jacks on the lower wing. In this case failure

occurred while loads were being added slightly in excess of F. S. 6, 5. This test was continued on the other side until the lower rear spar broke at identically the same place as the left spar at a loading slightly over 8. No deflections were taken after the first failure, as they would not give a true indication of spar deflections. Slight buckling in the outer struts was of spar deflections. Slight backling in the outer struts was observed at the higher loadings, but it did not assume alarming proportions at any time. Long before the first failure in at the place where the final failure occurred, this, undoubtedly, being caused by an accident that occurred to this wing when being set up, but at the time was not considered serious. It may have weakened this wing considerably.

This may be observed in the photograph figure 5, and is

Ins may ne onserved in the protograph ngure 5, and so confirmed by the much greater strength of the right wing and the smoother deflection curve noticeable in this wing. The failure in the upper wing year and strut head are not of much value as they were, probably, caused by eccentric loading due to the condition of the lower wing.



Figure 9-Front view of upper front spar failure

Conclusions

The Victor Plane was intended to have a factor of safety of 6.75, and taking into consideration the strength of the left of oxy, and taking into consideration the strength of the fetting, despite its weakened condition, and the much greater strength of the right wing, it may safely be concluded that the structure is strong enough and very safisactory. The rather small retreat in the wings shows that the single struts are adequate in replacing the usual incidence wires in small machines of this type, but it is questionable whether this type of strut could be used on a much larger machine. The only drawback to this kind of construction is that it does not allow much freedom of adjustment of wings for stagger or incimuch treedom of adjustment of wings for stagger or inci-dence, but it, undoubtedly, does reduce the parasite resistance, and no fault can be found with the strength. Considering that the wings weigh less than 71 lb, per sq. ft. complete, the strength of the entire structure is very surprising, and a credit to the manufacturers.

(To be concluded)



Figure 8-Rear view of upper front spar failure and interplane strut head at factor of safety of nine

SECOND PAN-AMERICAN AERONAUTIC CONVENTION AND EXHIBITION

To Be Held Under the Auspices of The Aero Club of America, The Aerial League of America and the Pan-American Aeronautic Federation.

> From Thursday, May 1st, 1919, June 1st. inclusive. Atlantic City. N. J.

Intercollegiate Contests Throughout the Summer CONTESTS TO BE HELD EACH SATURDAY

- (1) Seaplane Contests (general),
- (2) Curtiss Marine Flying Trophy and Prizes,
- (3) Intercollegiate Seaplane Contests,
- (4) Land Aeroplane Contests.
- (5) Dirigible Contests,
- (6) Kite Balloon Speed in Ascending and Descending, and Maneuvering Contests,
- (7) Parachute Competition.
- (8) Aviette (bicycles and motorcycles with wings) Contests.

EVERY DAY ACTIVITIES

- (1) Exhibits of Aeroplanes, Motors and Accessories on the Steel Pier.
- (2) Demonstrations and tests of Seaplanes, Land Aeroplanes, Motors, Dirigibles, Kite Balloons, to prospective purchasers and representatives of different governments.
- (3) Aerial Passenger Carrying by seaplanes and dirigibles, and kite balloon ascensions,
- (4) Moving pictures and Addresses by leading authorities on most important phases of aeronautics.

The Governments and Aeronautic, Sporting, Scientific, Industrial and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are invited a send representatives to attend this great aeronautic event. On arrival in the United States these and the send of the United States these Abstract, New York City, to register and receive their official badges and the official program. In the event that it is more convenient for them to go directly to oftlantic City they will register at the offices of the Compension located at the following Atlantic City hotels: Hotel Traymore, Hotel Challon, The Events of the Compension of the States of the Compension Committee will be at the Bureaus of the Aeronautic Convention at the above-named hotels and will state the official aboutes which admit the bearer to the Aeronautic Hall, as well as the Aero Exhibition on the Steel Pier, the judges' exclosure during contests, and to the Aeronausian and contests, and to the Aeronausian and the Aero Exhibition on the Steel Pier, the judges' exclosure during contests, and to the Aeronausian and the Aer

he demonstrated

All communications until May 1st, should be addressed to Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City. Entries for the competition should be addressed to the Chairman, Contest Committee, Aero Club of America, 297 Madison Avenue, New York City.



DAILY PROGRAM FOR PAN-AMERICAN AERO-NAUTIC CONVENTION, EXHIBITION AND CONTESTS

THURSDAY, MAY 1ST

Opening of Convention and Exhibit.

AFTERNOON—Reception at Aeronautic Hall on the Steel Pier. Addresses by United States Gov-ernment State and aeronautic authorities.

EVENING-Aero Show and addresses by officials.

FRIDAY, MAY 2ND

AFTERNOON—Aero Show. Preliminary tests of seaplanes, dirigibles and kite balloons.

EVENING-Moving pictures and address on flying for sport and pleasure.

SATURDAY, MAY 3RD

AFTERNOON—Seaplane and dirigible races, and kite balloon ascending and descending contest.

EVENING-Ball.

SUNDAY, MAY 4TH

MORNING-Memorial service by eminent Divine for the dead airmen.

AFTERNOON AND EVENING—Reception to al-lied aces and heroes of the air and their parents, and announcement of the award of the Aero Club of America Medal of Valor, and the Aerial League of America Diploma of Honor.

MONDAY, MAY 5TH

AFTERNOON-First parachute contest for \$500 Ben-

EVENING—"The Large Dirigible and Its Value for Transportation." Representatives of railroads, express, steamship and other transportation organizations invited to attend.

TUESDAY, MAY 6TH

AFTERNOON—Illustrated addresses on "Aerial For-est Patrol." Forestry Department of every State invited

EVENING—"Work of Aerial Police Squadrons, and Why Every City Should Have One."

WEDNESDAY, MAY 7TH

WEDINGSDAT, MAY /IH
AFTERNOON AND EVENING—Aerial Mail Day.
Illustrated address on, and consideration of,
'Aerial Mail Planes.' Chairman of Post Office
and the control of the control of the control of the control
resentatives and Senate, and Postmaster General
Burleson invited to deliver addresses. (26,000
United States Postmasters, and Chambers of
Commerce of 13,000 cities invited to attend.)

THURSDAY, MAY 8TH

AFTERNOON AND EVENING—Illustrated ad-dresses on the "Need of Municipal Aerodromes, and the Part to be Played by Aircraft in City Planning." Chambers of Commerce and City Planning Commissions of 13,000 cities invited to

FRIDAY, MAY 9TH

AFTERNOON—Arrival of seaplanes and army planes from Army and Navy Air Stations. Second parachute competition for the \$500 Bennett Prize.

EVENING—Illustrated addresses on "Latest Develop-ments in Aerial Warfare and Adventures in Aerial Warfare," told by famous aces.

SATURDAY, MAY 10TH

AFTERNOON-Army, Navy and Marine Corps Day. Aerial contests and tournament,

EVENING-United States Army and Navy Officers' Reception. Reception and addresses at Aero-nautic Exhibition Hall on the Steel Pier,

SUNDAY, MAY 11TH

AFTERNOON AND EVENING—Presentation of the flags by each State of the United States to the Aero Squadrons representing the States. the Aero Squadrons representing the States. Each State will present a flag to each Aero Squadron, the members of which were over-whelmingly natives of that State. The presenta-tion will be made by representatives from the State and the Aero Culb and Aerial League State and the Aero Culb and Aerial League will be the Aero Culb and Aerial League with the state of the Aero Culb and Aerial League will be send delegates, and Aeroy, Navy and Mazine Coros to, send representatives. Marine Corps to send representatives.

MONDAY, MAY 12TH

AFTERNOON—Demonstrations and illustrated ad-dresses on the "Value of Aircraft for Advertising by Day and by Night." All national advertisers by Day and by Night." All national advertisers and advertising agents invited to attend.

EVENING—"Pan-American Aerial Transport Over Land." Addresses by members of the commissions of the 20 Latin-American Republics.

TUESDAY, MAY 13TH

AFTERNOON AND EVENING—"Pan-American Aerial Transport Over Water." Addresses by members of the 20 Latin-American Republics' Commissions.

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH

AFTERNOONS AND EVENINGS—"The Airways and Aerial Transport in Europe, Canada, Africa, Australia and Asia."

FRIDAY, MAY 16TH

AFTERNOON AND EVENING—"Aerial Naviga-tion Instruments for Flying Over Land and Water." Aviators, navigators, scientific instru-Water." Aviators, navigators, scientific instru-ment makers and aeronautic experts invited

SATURDAY; MAY 17TH

AFTERNOON—Aerial races and contests. Illustrated addresses on Aerial Photography.

EVENING—Extensive exhibit of aerial photographs and photographic apparatus. All photographers, professional and amateur, and makers of photographic apparatus invited.

SUNDAY, MAY 18TH

AFTERNOON AND EVENING--Illustrated ad-dresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey."

MONDAY, MAY 19TH

AFTERNOON-Addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators,

EVENING—Illustrated address on "How Army Medi-cal Standards and Inspection Lessen Accidents." Insurance companies and agents invited.

TUESDAY, MAY 20TH

AFTERNOON AND EVENING-Illustrated addresses showing different ways of crossing At-lantic by air and the problems to be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST

AFTERNOON-Aero Safety Day. Discussion of aero safety provisions made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in

EVENING - Progress Made in the Art of Piloting Aeroplanes." Illustrated.

THURSDAY, MAY 22nd

AFTERNOON AND EVENING-Addresses and EKNOUN AND EVENING—Addresses and discussions of meteorology—"How the Weather Forecasts Can be Extended and Made More Efficient by the Use of Aircraft in Exploring the Upper Air," also "How the Weather Forecasts Help Aerial Navigation," and "Telegraphic and Climatic Factors in Relation to Aeronautics.

FRIDAY, MAY 23RD

AFTERNOON AND EVENING—Addresses on "Aerial Jurisprudence—Aerial Laws and Regula-tion of Air Traffic." (First day.) Lawyers, traffic commissioners and police authorities of different countries invited

SATURDAY, MAY 24TH

AFTERNOON—Races and contests. EVENING—Illustrated address on "Need of Establishing Altitude Levels for International, Inter-state and Interurban Air Travel."

SUNDAY, MAY 25TH

AFTERNOON AND EVENING-Aeronautic Art Day, Address on "Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paintings," by Lieut, Farre, Lieut, Ruttan and Paintings, All prominent artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK.

MONDAY, MAY 26TH

AFTERNOON—"Aeronautic Engineering Prob-lems and Their Prospective Solution."

EVENING—Opening of contests for designs and

ideas for large aeroplanes.

TUESDAY, MAY 27TH

AFTERNOON-Factors That Increase the Efficiency for Large Dirigibles."

EVENING—"Advantages of Veneer and Plywood for Aircraft Construction.

WEDNESDAY, MAY 28TH

AFTERNOON-Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective olution.

EVENING-"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON—"Flying Boats Versus Hydroaero-planes for Sport and Transportation."

EVENING—Contest for designs and ideas for large aeroplanes

FRIDAY, MAY 30TH (Memorial Day) AFTERNOON-Dirigible races, kite balloon speed

ascending contest; parachute contest. EVENING-Reception at the Aeronautic Hall, Steel Pier

SATURDAY, MAY 31ST

AFTERNOON-Seaplanes, land planes and dirigible contests. Aviette competition at which all cyclists and makers of bicycles and motorcycles will be invited.

EVENING—"International Medical Standards for Aviators in War and Peace." Reports from dif-ferent countries illustrated with attractive films. 50,000 medical men invited.

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING-Award of prizes and diplomas for all events.



and temperature. Difference of atmos-pheric conditions appropriate to different pheric conditions appropriate to different cleavations affect the power, speed and consumption of an engine in ways which, without giving information to the enemy, may be considered in a purely elementary method of supporting the engine (as in an acroplane), which has its own influence on the results, and to such details as carburetion and ignition, which from a practical point of view are essential face.

It will be assumed then (a) that the engine is simply supported in the atmosengine is simply supported in the atmos-phere on an even keel and clear of ob-structions, (b) that its work consists of driving a propeller, (c) that it is supplied with a mixture of a constant proportion by weight of air to petrol, and (d) that the barometer at sea level stands at 29.9 inches and that the temperature there is 60° Fahr, or 521° absolute. Since further approximations are used, it cannot be exapproximations are used, it cannot be ex-pected that the concluding table exhibits with complete accuracy even the results to be expected on these assumptions. Frac-tions are merely the arithmetical results of calculations from the assumed data and

have no further significance.

If ABCD (Fig. 2) is an indicator diagram, the pressure at A will be f, the atmospheric pressure in lb. abs. per square



FIGURE 2

inch, and if n be the compression ratio the pressure at B will be pur.

the pressure at B will be pnr. With a constant mixture the pressure at C will be Mpn where M is a constant, and, since the mean pressure is proportional to the difference between the pressures at B and C, it is proportional to p (M — I), since n^p is constant.

The temperature at A is I, the tempera-ture of the charge at the end of the inducto the charge at the end of the indiction stroke; then the temperature at B will be tn^{p-1} , and, if N be the constant amount by which the charge is capable of raising its own temperature, on firing, the temperature at C will be $N + tn^{p-1}$, which is

$$\frac{N+tn^{p-1}}{tn^{p-1}}$$
 or $\left(\frac{N}{tn^{p-1}}+1\right)$ times the

temperature at B, and therefore

$$\begin{split} \mathbf{M} = & \left(\frac{\mathbf{N}}{tn^{p-1}} + 1 \right) \text{ or } (\mathbf{M} - 1) = \frac{\mathbf{N}}{tn^{p-1}} \\ \text{and } (\mathbf{M} - 1) \text{ is proportional to-}, \text{ and the} \end{split}$$

mean pressure is proportional to -. Con-

sequently horse-power is proportional to

This result is supported by experimental results obtained at ground level, but a difficulty arises in expressing by a simple formula the value of t so that calculations of the horse-power corresponding to high-

er elevations may be made. Since the charge is introduced into a hot cylinder containing part of the higher than the at-mospheric temperature T, and since for equal volumes the specific hear of the denser gas will be higher, it may be as-sumed that the amount by which the temperature of the entering charge is raised will be inversely proportional to its density. The author considers, therefore, that

it is sufficiently accurate to put:

H.P. = horsepower-constant

$$\times$$
 (r.p.ni.) $\times \left(\frac{F}{T + \frac{100}{1)}}\right)$ (1)

where p is the atmospheric pressure, T is the absolute temperature of the atmos-phere in degrees Fahr., and D is the density of the atmosphere expressed as a frac-

ity of the atmosphere expressed as a trac-tion, density at sea level being unity.

When an engine does work driving a propeller, the power is very nearly pro-portional to the cube of revolutions and to the density of the medium in which the propeller revolves, and so we may put: H.P. = constant × (r.p.m.) × D ... (2) Equating the right-hand members of

(1) and (2): Constant × (r.p.m.) × D

$$= (r.p.m.) \times \left(\frac{p}{T + D \frac{100}{D}}\right)$$

Horse-power ber Cent.

Constant
$$\times$$
 (r.p.m.)² = $\frac{\hbar}{DT + 100}$
(r.p.m.) = constant $\times \sqrt{\frac{\hbar}{DT + 100}}$.. (3)

Height

above Sea	R.P.M.	Horse-powe
Level. Feet.	per Cent.	ber Cent.
0	100.00	100,00
2,000	99,40	92.40
4,000	98.76	85.19
6,000	98.07	78.38
8.000	97.34	71.95
10,000	96.56	65.88
12,000	95.73	60.16
14,000	94.84	54.80
Height		
above Sea	R.P.M.	Horse-power
Level, Feet,	per Cent.	per Cent.
16,000	93.90	49.77
18,000	92.90	45.05
20,000	91.83	40.66
22,000	90.71	36.57
24,000	89.51	32.77
26,000	88.25	29.25
28,000	86.91	26.01
30,000	85 51	23.03

The engine speed may therefore be calculated from (3) and the horse-power from (1) or (2), using the values of p, T, and D tabulated in the previous article and the constant which fits the sea level figures. The results for elevations up to 30,000 feet are stated in the above table.

If the truth of Equation (1) be assnmed, the consumption per horse-power should be the same at all heights, for the consumption should be proportional to:

D \times (r.p.m.) \times -

and since H.P. :=
$$\left(\frac{h}{T + \frac{100}{100}}\right)$$
 (r p.m.)

$$\frac{T}{T + \frac{100}{P}} = \frac{h.p. \times T}{p \times (r.p.in.)}$$

and consumption is therefore proportional

$$D \times (r,p,m.) \times \frac{h,p. \times T}{f \times (r,p,m.)}$$

$$= h,p. \times \frac{DT}{f}$$

$$\frac{DT}{f} = \frac{T}{f^{2}} = \text{constant.}$$

Therefore consumption is directly proportional to horse-power.

But the increase of temperature of the entering charge is due to two causes: First, the temperature gained by contact with heated metal which does affect the with heated metal which does affect the weight of the charge, and, secondly, the temperature gained by mixture with the products of previous combustion which does not affect the weight of the charge. This latter statement may appear self-evident to some readers, but will not to others. It may be proved shortly as fool-lows, assuming that the two increases of temperature take alone senarately. temperature take place separately.

In Fig. 3 (a) v is the total cylinder volume and the compression space, unity, is filled with products of combustion at temperature M. On the induction stroke a



FIGURE

volume of charge heated to temperature T by contact with the cylinder is mixed with the products of combustion, so that the temperature of the whole becomes N, which is less than M and more than T If then the products of combustion and the charge were separated as in (b) they would occupy the volumes x and (v-x). which also represent their relative weights, and therefore

$$N = \frac{xM + (v - x) T}{v}$$
But
$$\frac{x}{1} = \frac{N}{M}$$
therefore
$$N = \frac{N + (v - x)}{v}$$

and
$$N(v-1) = T(v-x)$$

 $v-x = v-1$

which proves the proposition, and the charge is, therefore, always of (v-1)volumes at temperature T.

It is not found, however, that the introduction of this complication into the calculation reveals any material departure from the simple relation stated that with a mixture of constant proportion by weight the consumption per horse-power remains constant at all heights.



NAVAL and MILITARY **EDONAUTICS**



Key to Abbreviations

ABC-Report to Army Balison School, Arta KR-Report to Kelly Field, San Astonio, AGC-Report to Ariation Supply Depot, Garman Sanghy Depot, Garman Sanghy Depot, Martines, Virginia Supply Depot, Martines Supply Depot, Martines, Virginia Supply Depot, Martines, Virgini CFT—Report to Carruthers Field, Fort Worth, CGC—Retach Aviation, Conceptration Camp, Carden City, L. I., N. Y. CIS—Report to Camp Jackson, Columbia, S. C. CW—Report to Camp John Wise, San Annelson, Texas, CGL—Retach, Texas, Texas, Texas, CGL—Retach, Texas, CGL—Retach, Texas, CGL—Retach, Texas, CGL—Retach, Texas, CGL—Retach, Columbia, CGL—Report to Call Field, Wichita Falis, Texas, CGL—Report to Call Field, Wichita Falis, CGL—Report to Call Field, Wichita Fal DAT—Report to Director of Algrent Pro-bins of the Control of Algrent Pro-bins of the Control of Algrent Pro-pagation of the Control of Military Aero-nautics, Washington, D. C.

BOT—Beyort to Eleganty Pied, Director of Consha, Neb.

PSO—Regort to Eleganty Pied, Line, Team, CLC—Report to Gernine, Field, Lake Charles, HIM—Regort to Gernine, Field, Lake Charles,

PWM—Report to Payne Field, Mulington, Ienn.
PWM—Report to Payne Field, West Point,
Miss.
RSD—Report to Rockwell Field, San Diego,
Cal. Cal.

—Report to Rich Field, Waco, Tex.

—Report to Taliaferro Field, Fort Worth
Tex. (When specified in the order
the number of the field is given it

the numous control of Military Aerona to School of Military Aerona to School of Military Aerona to School of Texas, Australia eses.) o Taylor Field, Montgomery,

tics, University of Tes.
WDM—Wire Director of Military Aeronauucs upon arrival.
WFO—Report to Wilbur Wright Field, Fairfield, Ohio.

HHM-Report to Hazelburst Field, Mineola, Note I-Report to places mentioned in the order named.

Note 2—Report to Little Building, to district manager aircraft finance, Boston, Mass. The Control of Adjustant General, Washing Agent to the Adjustant General, Note 4—Report to Sixth Aero Squadron, Honolulu, Hawaii.
Note 3—Report to 360 Madison Avenne, New York City, to district manager aircraft

New York City, to district manager aircraft finance. —Begent to Bolling Field, Washing-Boulet, C., for duty, Bolling Field, Washing-Oct., for duty, Bolling Field, Washing-Oct., For duty, Bolling Field, Washing-Oct., Note 3—Report to Commanding Officer, Acceptance Fark, Dayton, Ohio, for duty and by letter to D. M. A—Washington, Sundern, Bellette to B. M. A—Washington, Os Sundern, Aberdeen, Proving Grounds, Aberdeen, Md. Note 11—Recort to 1530 Woodward Ave.

Note 10—Report to 2714 Acro Squarlers, Arctices Prompt Grounds, Aberlean Marketten Town Grounds, Aberlean Marketten, Marketten Town Grounds, Grounds, Aberlean Reiterst, McC. 10.10 Woodsware, Darrett, McC. 10.10 Woodsware, McC. 10.10 Woodsware

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	Griffith, Ralph E	Note 14
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	Slaughter, Edgar H.	Note 16
	Simonin, Arthur E	

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Taylor, LeWallace W	e 18
Walsh, Eugene W	AGC

Total Casualties in Aero Service Abroad

Warkington, March 21.— Cassaltics in the United Statea Air Service personnel, serving with the American and Althed armies at the with the American and Of the total, 171 men were killed in combat.

A table made public by the War Department gives the following official cassalty report for the air service at the front:

Killed in combat. 171: prisoners, 135;

Killed in combat. 421: prisoners, 135;

Killed in combat. 422; other causes, 102;

State of the Cassaltic State of the State of the American State of the wounded, 129; missing, 73; killed in accutents, 42; other causes, 4.

The record by months shows the rapid rise in casualities as American filters began to get into action. 11 follows:

March, 1918, 2; April, none; May, 27; Jnne, 29; July, 65; August, 82; September, 181; October, 125; November II, November II, 40.

War Department Policy on Retirement of Officers Explained by Order

Washington, D. C.—The War Department re-mily made public a general order outlining to policy followed in the retirement of officers, cently made publi the policy followed as follows: Circular No. 69.

War Department, Washington, February 8, 1919. Assignment and Demotion of Officers

Assignment and Demotion of Officers

1. During the period of the energency, officers
who are assigned to line duties will be assegged
serviced in the Talders of Organization. In making assignments to staff or other duties, not
organized to the trade of the trade of

Department demoting uness to the Army rank.

2. When officers of the Regular Army become surplus in their emergency grades their names will be reported to the War Department. If warancies exist to which they can be assigned in their emergency grades their names will be

reported to the War Department. If vasancies came to wheth they can be assigned in the rear to what they can be assigned in the rear to what they can be assigned in the rear to what was not considered to the rear to the re

rned.
By order of the Secretary of War:
Pryron C. March,
General, Chief of Staff.

Official: P. C. Harais, The Adjutant General.

Air Service to Follow Overseas Organization Washington, D. C .- The War Department au-thorizes the following statement from the Direc-tor of the Air Service:

In connection with the recent announcement regarding the organisation of the Army Australia, and the control of the Army Australia, and the control of the Army Australia, and the control of the Australia and the processing of the Australia and the composed of four others, one at the head of the word. The Director's Executive Staff is composed of four others, one at the head of the control of the Australia and the control of the Australia and the Aus

assisted General Menoher in working our sur-new system.

The fourth assistant executive is practically the Adjustant General of the Air Service, con-trolling administration and executive work, per-sonnel, office management, cables and corre-order.

sonnel, office management, cables and corre-pondence, etw. m. C. Sherman, Corps of Engi-neers, who is a filer and who has been con-neers, who is a filer and who has been con-been detailed as Chief of Air Service Training, which will include heavier-than-air training at the ground schools and flying fields under Gen-eral Mitchell.

Air Service Division of Surgeon General's Office Discontinued
Washington, Discontinued
Discontinued
Discontinued
Washington, Discontinued
Discontinued
Discontinued
Discontinued
Office of the Surgeon General

War Department Announces the Fields It Will Purchase

Washington.—A decision by the War Department to proceed with the purchase of the sites of fifteen army camps and thirteen balloon and flying fields was announced by Acting Secretary

Crowell. Less than \$15,000,000 would be involved, Mr. Crowell said, and it would not be necessary to said action by Codipers, as the control of the control

Jersey, and Stuart and Hill, Newport News, Va. Approximately \$280,000,000 has been spent in construction work on the fifteen cantonments to be bought and the fifteen now owned. It was largely because of the sum involved that the Department decided to go ahead with the purchase.

was largerly because of the sum involved that the baser controlled to go about with the puriodistrict of the sum of the s

Secretary Crowell also said that the department had contemplated retaining Harshuret and contemplated retaining Harshuret cost entirely how too much. The option price on the field was placed at \$1,550,000, or nearly twice the cost of the air of any office threemone that the strength of the threemone that the field of the strength of the threemone that the field conderable more than has given at his field, conderable more than has given the strength of the st

Decision on Aviation Fields

Flying and balloon fields, the sites of which are owned by the Government and which are to be retained and the cost of construction on each, are:

sch, are:
Langley Field, Virginia, 36,782,109.
Port Field, Oklahoma, \$2,263,000.
Rockwell Field, California, \$552,000.
Rockwell Field, California, \$552,000.
Lee Hall, Virginia, \$618,150.
Fort Omaha and Fort Crook, 2 Crook, Nebraska, Fort \$597,663.

Flying and balloon fields under option and to be purchased for military purposes, and the cost of construction on each, together with the price at which the land will be bought, are:

0. Park Field, Tennessee, \$2,097,079—\$88,010. Souther Field, Georgia, \$1,220,497—\$32,534. Fields to be abandoned, with the cost of

each, arc: John Wise Field, Texas, \$268,266. McCook Field, Ohio, \$799,753.

McCook Field, Ohn, \$190,733.
Fields the sites of which are leased and which prices of the state of the state



The Briatel Bomber Triplane Type "Braemar" with 4 Puma engines



NEWS FOREIGN



Paris.—Definite information has reached Washington that Germany will be required to assume the required to assume the required to assume the required to assume the required to the received the receive

London-Paris Record Again Broken
Paris.—Major General John E. B. Seeley of the British War Offices
on March 16 few from Folkstone to Paris, a distance of 172 miles,
in 74 minutes, establishing a new record for the flight. The aeroplane
had the wind behind it.

Bolshaviki to Use Planes for Anti-Allied Propagaoda

Bolshaviki to Use Planes for Anti-Altied Frepagaoda

The Russian Bolshevik government is planning to use arreaft in a propaganda campangin in England and France, arcording to Swellows work are said to be in training at Moscow.

The scheme is to drop papers containing Bolshevik propaganda written in invisible tink.

ten in trivible tisk.

Michellan Wurs of Danger of German Commarcial Air Flesta

Faria—Andre and Edouard Michelie, discussing in La Liberit the

Brain—Andre and Edouard Michelie, discussing in La Liberit the

total suppression of commercial visuation in Germany, at any rate in

street instances. It is known that serial clauses in the peace treaty

The Michelin, who have played a great part in the development of

the Commercial plant and commercial machine; that is, that

the commercial plante has no hombridowing machiner; that is, that

the commercial plante has no hombridowing machiner; that is, that

hour upon any civilian acroplane, thus militarizing it. They draw a

pourus whereby Germany in one anglist by mobilizing all for evivilent

controlled the commercial planter and commercial machiner; that is the

distribution of the commercial commercial machiner; that is, that

the commercial plante has no bombridowing machiner; that is, that

hour upon any civilian acroplane, thus militarizing it. They draw a

pourus whereby (Germany in one anglist) y mobilizing all for evivilent

controlled the commercial planter in the commercial machiner in the commercial machin

Commission on Aeronautica Appointed by Suprama Council of Peace Conferanca

Conferanca

Paria.—The Supreme Council appointed a Commission on Aeronautics on March 17. The American members of the commission will be Rear Admiral Harry S. Knapp and Brig. Gen. Masson M., Patrick. The council named Belgium, Greece, Portugal, Brazil, Cuba and Romania to represent the small nationa.

King Albert Visit to Pershing by Aeroplane
Chaumont, France — King Albert and Queen Elizabeth of Belgium
are planning a flight from Brussels to Chaumont to pay a visit of several days to General Pershing.



A temporary observation station equipped with sound magnifying amplifiers, which detect enemy planes at a distance of several miles

Two Giant Dirigibles Ordered by England

London-Following successful trials of new British der Registre of the Following successful trials of new British der Registre of the Following successful trials of new British der Registre of the Following trials of the Following trials of the Following of two enormous arrisings. Each will be 800 feet end by 100 mg, with a capacity of 3,000,000 cube feet. They will be driven by said, will have a lifting power of 800 tons, compared with 29 tons, the largest load carried by any known to be in existence.

German Air Raid Damaga Over \$5,000,000

Bualc.—According to official Berlin statistics, the damage done in Germany by air raids during the war period amounted to 23,500,000 marks (\$5,575,000).

German Six-Motored Biplane for Transatiantic Trip

The Hague.—At Doberitz a new large Siemens-Schuckert hiplane is now undergoing trials ostensibly with the view of ultimately making a sid for the transatlantic record. The machine as designed would, it is estimated, accomplish the flight from Hamburg to New York in wenty hours. se estimated, accomptism the might from Hammirg to acce to the wenty hours.

Tanks with about 750 gallons capacity are fitted upon the aeroplane, and it is heliceved that the total fuel required, amounting to about three times this figure, could be carried by the machine, which has six engines with a total of 1,800 horsepower, driving four propellers.

bassadar Davis Flies to Cobla

Coblenz, March 15.—Ambassador John V. Davis and a company of prominent Britons, including Lords Peel and Burnham, respectively Licut. Gen. Gooley and two seek of .British major generals, brigadier generals and captains, arrived at Coblenz by aeroplane for a visit to the American Army of Occupation.

Vickera, Ltd., R-80 Dirigible Testad

Unders, Ltd., R-80 Dirights Testad
Landon,—Assuler giant dirights capable of crossing the Atlantic
received in forst trial on March 20. Her half is the most careful
bow mooring attachments, which enable her to be mored out from a
more than the state of the state of the state of the state
of the state of the state of the state of the state of the state
opposite sides of the airchip. The control care is of sufficient sides of the airchip. The control care is of sufficient sides of the airchip. The control care is of sufficient side to
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opposite sides of the airchip. The control care is of sufficient side to
opposite sides of the airchip. The control care is of sufficient side to
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for airship work
Arrangements are under consideration for preparing this ship to fly
aeross the Atlantic this summer. The airship will carry a crew of
satteen men and will have ample endurance to cross the Atlantic
carry a good number of passengers and still have a considerable margin to allow for flying against adverse without

Canadian Airways Selected

The Canadian Government is planning a series of mail and passenger

The Candian Generation is platfoling a series of mail and passenger air routers, as followed: Aerial Highway, exterion from St. Johns to Candian Payle Rairbod 1- Fort William and Winniper, 10 Regions, 10 Region

Aircraft Cargo Insurad

London.—Lord were recently requested to assure on the insurance of an arrest forward were recently requested to assure at \$7,000, for this insurent from London to Parts. The rate quoted was 15 per cent for all risks, including their.

The rate quoted was 15 per cent for all risks, including their attack, a resistant and General Baurance Co. Lot, has been organized, with a capitalization of \$5,000,000, for dealing in aircraft insurance.

enterprin

enterprise.

Another firm, Wheels and Wings Association, Ltd., is offering "flying insurance," and other large and old established insurance concerns are preparing to issue aircraft policies.

Kaizer Makes Another Strategic Retreat

Amerongen, Holland.—Considerable excitement was created at Amerongen tartle, where the fuguity Emperor William is staying, when six They rame from the cost and, after entering the cashe twice, dispersed in a northerly direction.

The nationality of the machines could not be distinguished owing to

approach in a normersy unrection.

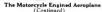
The nationality of the machines could not be distinguished owing to the overcast weather, but it is generally assumed that they were Dutch.



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F McMahan



The tail and rudder are built up in the ordinary way, and covered with muslin also. They are then doned and mainted

or varnished. The turtle deck must be made as light as possible, and another thing to remember is that when bracing the body to the rear of the pilot's seat, the wires do not run from the top of

the strut following, but instead it goes over to the hottom fitting of the next strut on the opposite longeron. This method does away with the customary cross bracing which holds the

Dody rigid cross ways.

The wheels should be very light, in fact I would specify 20 x 2" and covering them over with muslim doped to insure them being drum tight. This makes a neat stream line wheel. The rim should be of wood instead of steel if possible.

The enion is wood unstead of sect if possion. The engine is will describe later, but if the reader wishes to use a standard two cylinder motorcycle engine he can do so; but it might be necessary to use a little more surface and to design some kind of reduction gear arrangement, as would be impossible to run the propeller at the high speed that a motorcycle would turn up to develop sufficient horse power to insure the machine flying.

The propeller should turn up one to two, that is while the engine turns two times the propeller turns but once. This allows the propeller to turn slower, thereby insuring the maximum efficiency.

The Curve we are using is the U. S. A. No. 1, and a profile

is given here with dimensions. The accompanying cut gives all the dimensions necessary for the building of the Motorcycle Engined Aeroplane, men-tioned in the last issue of AERIAL AGE.

The machine when complete should weigh no more than 300 lbs., net weight. This with the pilot and fuel will bring the gross weight to 500 lbs. The U. S. A. Wing Curve No. 1 shows a Ky of .003165 at an angle of 14° at 35 M.P.H.

we need

$$\frac{500}{.003165 \times 35^{1}} = 128$$
 square feet.

We are using a gap of four feet and a chord of three and a half feet. This combination gives us an efficiency of nearly

100 per cent in our hiplane arrangement and we need not add

any surface to compensate for theoretical loss.

The spread of the wings being 18 feet and the chord 3½ feet gives us approximately 120 square feet surface, considering the loss of the section over the pilot's head and the ends of the wings.

An engine of the kind I-speak of as a Three Cylinder Motorcycle engine develops about 27 horse power, which is con-siderable for a machine of this light weight, and we should get good speed.

Ti the person attempting to build this machine should not care to construct a motor of this kind, he could use the W. B. B. Motor, which develops 38 horse power and weighs 130 lbs, and sold ly the Lawrence Sperry Aircraft Co., Farmingdale, L. I; the Lawrance (0) horse power ace engine, sold by the Lawrance Aero Engine Corp., No. 644 West 44th Street, New York City. This engine also weighs but 130 lbs., and with this horse power the machine could attain tremendous and with this horse power the machine could attain tremendous speeds. Or a fair compromise and one that would just equal the performance of the three cylinder engine I proposed, is the and which is the type of motor the Governmen used on the training penguins. A quantity of these motors are advertised in the advertising columns of this paper by Mr. E. C. Marble, No. 12 South Jefferson Street, Chicago, Illinois. Any of the motors metilioned above can be used with good

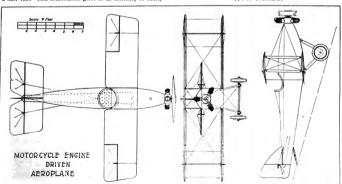
s, but of course the greater the horse power the faster results, but of course the greater the horse power the faster you fly. The weights of these motors, being almost alike, one or the other would not change the balance of the machine. A single set of struts are used instead of two, as on the Ford Motored Machine. The controls are hooked up in the same Iashion, and as I mentioned in an earlier article the Ford Motored fittings can be used on this machine. The covering of the machine is unbleached muslin tightly stretched over the body and the wings, after which a couple of coats of wing dope is applied, and when dry a coat of good of coats of wing dope is applied, and when dry a coat of good

outside aero varnish. A speed of close on to 80 M.P.H. will be attained with a

motor of 27 horse power. The wings must be set at an angle of 1° only. 1° means that the entering edge must be about of 1° only. 1° means that the entering edge must be about 34" heigher than the trailing edge.

A machine of this type will be very difficult to handle for an experienced pilot and very cranky in the air.

(To be continued)





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It afready has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your conv. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Aviation For Journalists

Time, space, everything will be brought by aeroplanes within striking distance of our great dailies. I can foresee news from all over the world side by side every morning with that from our own capital. And evening papers will vie with on another in the swift turn-out of racing and football results, etc. The problem of the future will not be: "Shall I buy a new linotipe?" but "Ought I to invest in an aeroplane?"—M. L. N. in The Newspaper World.

Lieut. Matchez of this field announces his engagement to Miss Violet Paper, of Los Angeles.—Ellington Field Tail Spins.

We happen to know Lieut. Matchez; and we would suggest to Miss Paper that she watch out. She's liable to get burnt.—Kelly Field News.



"Yes! Two seats in the first class. You can come up"

--From "La Rive", Paris

This Is the Aeroplane's Day

The wonders of aircraft are come to stay, For this is now the aeroplane's day, And the time is coming when we shall see Travel by airlines, and that there will be Airships equipped o'er the ocean to fly, On which 'twill be the fashion, by the bye, To book passage should one's fancy incline To visit Europe via "Cloud Line."

There is now a Cloudland mail as we know, An air rouse by which our letters may go, So that in a billet-doux we may say, "My thoughts, dear, are flying to you today." The aerial postman skilled must be In aviation, in order that he May perform his hazardous tasks with care In deliv'ring the U. S. mail by air.

In the sporting world, too, we soon shall see, Many contests for air supremacy, With the bird-men competing for first place, And matching their air yachts in a great race For a cup; and the Fliers from ev'rywhere, Interested in airsports will be there. Tis the world's new sport that is come to stay, For this is now the aeroplane's day.—Rose Villar.

Hee—"What kinds of machines do they use for reconnoitering?"
Haw—"Seaplanes, I suppose."

A Flight to Fame

(With Apologies to Messrs. Gilbert and Sullivon.)
When I was a boy I went to war.
As an air-mechanic in the Flying Corps.
I dished out dope, and I swung the "prop."
And I polished up my talents in the fitter's shop.
I polished up my talents so carefully
That now I am a General at the Ministry.

As an air-mechanic I made such a name That a sergeant-major I soon became. I wore a gay tunic and a Sam Browne belt, And my presence on parade was acutely felt. My presence was felt so overwhelmingly That now I am a General in the Ministry.

As a sergeant-major I made such a hit I demanded more scope in which to "do my bit." Of my bify ways there was never any doubt, So they sent me up a-soaring in a Sopwith Scout. I flew so finely over land and sea That now I am a General in the Ministry.

I worked in France with such amazing zest That the King grew tired of adorning my breast. People boosted McCudden and Bishop and Ball, But they readily agreed that I outsoared them all! They declared my merit so convincingly That now I am a General in the Ministry.

Now, air-mechanics all, wherever you may be, If you wish to climb to the top of the tree, If your soul isn't fettered to a pail of dope, Just take my tip—then there's always hope; Be smart in the Strand at saluting me, And you all may be Generals at the Ministry.

—G. S. in "Flying"—London.





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Permanent

School Directing and Instructing, Piloting privately owned (commercial or pleasure) machines, Aerial Mes-sage and Parcel Delivery, and in all other directions where permanent appointments are possible.

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(Continued from page 165)

cycles and, later on, for the very first electrical automobiles, which were extremely heavy.

The Amory principle consists of a pneumatic rubber fabric cushion with resilient walls placed between flat metal plates. so arranged that the cushion is double acting and capable of so arranged that the cushion is double acting and capable of absorbing shocks taken both unward and downward, thereby unlifying vibration. The cushion itself resembles a miniature automobile tire with the air valve on the outside tread. It may be inflated to any desired air pressure by means of a small hand pump. The size of the cushion depends, of course, upon the weight of the machine to which it is attached. It is expected that a pair of these absorbers suitable for the average training plane would probably not be completed to an aeroplane, but its natural evolution from bicycles, carriages, pleasure cars, and heavy motor trucks points the way to its adoption to the most modern which, the acroplane, where complete to to the most modern vehicle, the aeroplane, where complete shock absorption is of even greater importance than in any of its forerunners.

The practicability of the cushions has been proven, and it The practicability of the cuisions has need proven, and it merely remains for its designers to work out the actual attachment of the province of telescoping tubes, or enclosed in a fitting terminating upper ends of landing chassis members.

Single pneumatic cushions may be used, arranged so as to resist the pressure of compression plates fixed respectively to the chassis members on one hand and to the axle or other lower members on the other hand (Fig. 2). These compression plates are alternately arranged and moved past each other as the fuselage moves up and down with the relation to the wheel carrying member.

Another form which this shock absorber may take is in the employment of pairs of pneumatic cushions, one upon the other and taking the landing shock and rebound respectively (Fig. 1). In this case the rebound cushion is brought into

play more promptly and is much simpler in operation than the single cushion used for both impact and rebound. The accompanying diagrams of the Amory air cushion principle, drawn by the Technical Editor of Azarat. Acz, do not represent the finished design, but merely illustrate the principle of action and give an idea of the varieties in which the device may take form. Laboratory experts will make exhaustive tests on the various fittings employing this air cushion principle, and reduce the device to an efficient, simple and compact arrangement that will result in minimization of dangerous rebound and secondary shock in landing.



Application of the Amory shock absorber on a scout aeroplane



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Wings

HUNDREDS of thousands of people who visited the Aeronautical Exposition which ended last night must have realized that we are literally and without exageration on the threshold of a new age whose developments the most imaginative can hardly foreshadow. The change in the outward appearance of civilization made by the railroads between 1800 and 1800 will very possibly be far surpassed by the changes which aviation will make in the next half century. A few years ago one of Mr. H. G. Wells's romance predicted to the settlement of cities on plateaus now inaccessible, and in oases now shut off by all but impassable deserts-sites which the commercial airship and aeroplane will make as easily attainable as is any scaport today. Even in 1913 this seemed fanciful, but it will hardly seem so to any one who studied the exhibits in Madison Square Garden and the Sixty-muth Regiment Armory. The dominion of the air has been won, and securely won; and the whole direction of our life is likely to be changed in consequence.

The exhibits were the more striking in that almost all of the recent progress of the art of flying has been made under war conditions, and consequently was kept secret to a very large extent from the public. What we are seeing now relarge extent from the public. What we are seeing now re-vealed is the hitherto largely hidden accomplishment of three or four years of work.

The exhibits of aeroplane accessories were clear indication that within a few years there will grow up around the manufacture of aircraft a trade in accessories not much less important than that now ancillary to the automobile business. But while the commercial possibilities of aircraft may have to wait a few years for their fullest demonstration, their scientific importance can already hardly be overestimated. The acrial photographs shown at the Garden mark a wholly new stage in map making, and there are many other fields in which the conquest of the air will clear the way for the more satisfactory solution of problems that have long hampered geographers and meteorologists.-Editorial in New York Times.

New York Needs Nearby Aeroplane Landing Fields

T is rapidly becoming apparent that it should be made some planes in the immediate neighborhood of Manhattan. The only regular departures and arrivals of mail carrying aeroplanes hereabout are made so far from the city's centre that a large part of the transit time saved by the speed of the planes is lost in the relatively slow transfer of their loads to the Poss Office for sorting and other preparation for delivery. But that is only the beginning of this new traffic; only an incident demonstrating the need we have suggested.

Great things are in prospect for the commercial use of aeroplanes. It means something more than play or sport than an order has been placed involving the expenditure of half a million in planes, equipment and operation for a cross-continent aeroplane line; that in a successful experiment a merchant has delivered to an out of town customer a ton of household goods by aeroplane; that devices are announced which, it is confiby aeroplane; that devices are announced which, it is commently promised, will insure a great stability for a plane in the desired promised to the passengers, its course laid by compass, has flown throught fog from Dayton, Ohio to a Loug Island field, making its appointed landing with speed and safety.

These things surely must be forerunners of large uses of

aeroplanes for mail, express and passenger service, and not in the far future. But where, near Manhattan, are these ships to arrive and depart if the services they offer will not be attended with such delays and inconveniences as to handicap their popularity, restrict their patronage? Van Cortlandt Park has been suggested as offering landing sites, but park space is too valuable for recreational purposes to be otherwise occupied.

The New Jersey meadows, drained or filled, neither a difficult undertaking, we are assured with thousands of acres crossed by railways offering quick entrance into Manhattan, suggest themselves. We hope that other and perhaps better adapted sites capable of great extension may be found. But some one who can do things must be alive to this.—Editorial in New York Sun.

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HULL.

Blackburn

(Continued from page 157)

shaft. The oil pump crankshaft drives the plunger which slides in the oscillating cylinder and an adjustable spring keeps the oscillating cylinder against the oil pump cover, which contains a pressure outlet. The inlet of the oil takes place through the lower tube; a plug is provided at the high-est point to allow the air to be expelled from the pump before starting up.

The oil is conducted by a pipe to a union on the top of the main bearer plate; it penetrates the crankshaft and flows through a channel arranged in the aluminium oiling sleeve, from which it passes through oil holes drilled through the crankshaft into the crank web and crankpin.

The small oil channels from the aluminum oil sleeve provide lubrication for the ball bearing and the cam boss ball

A drilled hole in the crankpin provides oil for the connecting rod thrust block and its bearings.

On leaving the crankpin the oil passes through oil holes in the thrust block, which break through the three grooves in which the heles of the connecting rods run. The oil subsequent to leaving the thrust block is thrown by contrifugal force on to the small ends of the connecting rods, and finds its way into the gudgeon pin bushes and piston bushes.

The oil that labricates the ball bearings on which the cam boss, from which it is thrown by centrifugal force into channels in the cam rockers. Oil holes in the cam rockers conduct the oil to the induction cam roller bush and cam rocker bush.

A sight feed lubricator is provided in the system, which shows by a pulsating movement that the oiling arrangements are in order. The air imprisoned in the glass is compressed at each stroke of the pump jiston, and as long as there is indication of this, the pump jistoring a regular supply of oil.

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APRIL 7, 1919



British R-33 Dirigible, which may fly to Atlantic City Aeronautic Convention during May

Owners of New York World and St. Louis Post-Dispatch Offer Trophy for Competition at Atlantic City





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Ball, Roller, Thrust, Combination Bearings





Vot. IX

APRIL 7, 1919

No. 4

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NEW YORK, APRIL 7, 1919

No. 4

OWNERS OF NEW YORK WORLD AND ST. LOUIS POST-DISPATCH OFFER TROPHY FOR COMPETITION AT ATLANTIC CITY

\$35,000 PRIZES AND TROPHIES

R ALPH PULITZER and Herbert Pulitzer, the owners of the New York World and St. Louis Post-Dispatch, have offered a trophy for annual competition, to be open to U. S. Army, Navy and Marine Corps aviators, who will compete in number.

The first competition for this trophy is to be known as the Aerial Derby," and is to be held in connection with the One Month Aeronautic Convention at Atlantic City, beginning with May 1st and ending May 31st.

The Pulitier Trophy is to go to the aviator who covers the longest distance in non-stop flight in cross-country flying over land or over water, or both, in flying from any given point to Atlantic City to any other point during the month of May.

There are no restrictions as to the type of aeroplane to be used, or the amount of horse power, the purpose of the competition being to demonstrate the great distances that can be covered by present day aircraft, large and small.

It is provided, therefore, that there shall be inscribed on the trophy the name or names of the aviator or aviators who cover the longest distance with one, two, three or four motors. The aviator or crew who has covered the greatest distance in non-stop flight flying aeroplanes of any of the above men-tioned classes will be designated as the winner or winners in their respective class.

To facilitate the organization of the "Aerial Derby" the Contest Committee of the Aero Club of America will ac-cept the entries of aviators without the formality of having a special entry blank, provided the entries are made by letter or by telegram, stating the type of aeroplane they will use and

the horse-power.

To facilitate the race the Contest Committee will also accept the written statement of the Commanding Officer of the Station from which the aviator starts, or his representative giving the time of departure of the aviator from the station.

In case the aviator has to make a forced landing before reaching Atlantic City or his destination, he will request the local authorities to sign a statement giving the time and place and circumstances of landing, to be forwarded to the Contest Committee of the Aero Club of America.

The aviators who come on land machines can land on the new Atlantic City Aviation Field, which covers 160 acres and affords two runways of 2,500 feet each. Water machines can anoras two runways of 2,500 feet each. Water machines can land on the beach or at the special landing pontoon near the Steel Pier or on the water landing place on the north side of the Aviation Field. The naval seaplanes can then fly to the Cape May Station for the night, if preferred.

The aeronautic movement will be unanimous in expressing appreciation to Messrs. Ralph and Herbert Pulinzer for this applectation to access. Raipin and referent runner for fins evidence of their great interest in aeronautics and the encouragement which the offer of this trophy affords, especially at this time, when every effort should be made to stimulate aerial activity, so that American aeronautics may remain at

The offer of the Pulitzer Trophy and the holding of the "Aerial Derby" will afford a splendid opportunity for American aviators to again demonstrate their efficiency.

BRITISH AIR MINISTRY TO SEND DIRIGIBLE TO ATLANTIC CITY IN MAY

the forefront

THE British Air Ministry has sent a cable to Mr. Alan R. Hawley, President of the Aero Club of America, stating that the Ministry is considering flying a British dirigible to Atlantic City during the Second Pan-American Aeronautic Exposition and Convention, which is to be held at Atlantic City from May 1st to June 1st, under the auspices of the Aero Club of America, the Aerial League of America, and the Pan-American Aeronautic Federation.

The Aero Club invited the British Government to send one of its huge dirigibles to Atlantic City for the Convention in May. Following is the cable received:

"Your invitation for British airship to fly to Atlantic City, month of May, is under considera-

ì

tion. A further communication will be made to you shortly.

"(Signed) AIR MINISTRY,"

Mr. Hawley stated that the British dirigibles which may come over are the new R. 3d or the R.3d, which have been launched in the past month. They are rigid, have a hydrogen capacity of about 2,000,000 cubic feet, are 670 feet long, 80 feet in diameter and 95 feet high, and weigh 30 tons, laving 30 tons of useful load. They jift about 00, tons. They can easily make the trip to Atlantic City from England in about forty-eight hours, giving the crew Pullman car facilities. It will be de luxe travel.

Recently the R-33 made a trip with 5 officers, a crew of 23, and one passenger. She is equipped with five 250 h.p. Sunbeam motors. It has a cruising radius of 4,800 miles.

ARMY AERIAL ACTIVITIES CO-ORDINATED UNDER ONE HEAD

HE War Department authorizes the following statement

Title War Department authorizes the following statement from the Office of the Director of Air Service:

Goodmanton of all Army aerial activities under one head—Goodmanton of all Army aerial activities under one head—ganization now under way, that is, the substitution of the foundamental principle which made possible unified operations overseas, for the rather cumbersome methods followed in the

United States in the past.

The reorganization is designed to supersede the complicated dual war-time air establishment and at the same time to develop peace time activities, thereby assuring the full use of industrial, training and operation gains achieved during the con-

flict with Germany

Major General Charles T. Menoher, who at the time he was Major General Charles 1. Menoher, who at the time he was recalled to become Director of the Air Service, was com-mander of the Sixth Army Corps, and throughout its long service at the front, was in command of the Forty-Second (Rainbow) Division. He endeavored to apply to the Air Ser-(Rainlow) Division. He endeavored to apply to the Air Ser-vice the principle of co-ordination which was followed over-seas, not alone by the United States, but by Great Britain and France. He found the air establishment in two parts—Divi-sion of Military Aeronautics and Burcau of Aircraft Produc-tion. This plan of organization was temporary, destined under the terms of war legislation to pass out of existence six months after the signing of the treaty of peace.

Having in mind the problems of the future, General Men-

oher proposed a reorganization based on the divisional system.

As Director of the Air Service he assumes the position of As infector of the Air Service he assumes the position of responsibility. As an advisory board, each member representing an important branch of the service, he has designated the following: Col. Walter G. Kilner, Col. Arthur L. Fuller, Col. Henry C. Pratt, Light. Col. George B. Hunter, Lieut. Col. B. Q. Jones and Major Charles R. Cameron.

Dealing directly with him also are the air attaches of foreign

governments, thus enabling him to keep in contact with developments at home and abroad.

As every division overseas has had a general staff, so the new Air Service has an executive organization. To carry out the policies which he alone formulates, and to attend to the the policies which he alone formulates, and to attent to the secretarial duties, the Director has designated an executive officer, Col. Milton F. Davis. Where two or more groups are concerned in any action, their activities are co-ordinated by the Executive Officer in carrying out the policies dictated by General Menoher.

The problem of dividing properly the duties of the various

branches was solved by turning once more to the divisional system followed so successfully overseas. The work has fallen system followed so successfully overseas. The work has failed naturally into four main channels or group—Training and formation, Publication and Statistics. The Chief of the Supply Group has charge of supplies, aeroplane engineering, production, procurement, inspection, maintenance, and finance dislusarement for the entire Air Service,

including both the old branches-Aircraft Production and

including born the enables of Military Aeronantics.

The Chief of the Information Group gathers and distributes the chief of the properties of the Information Group gathers and distributes. The Careful Statistics and publicity. In war time he would be considered the control of the Careful Statistics. all information, statistics and publicity. In war time he wou have charge of intelligence work for the whole Air Service.

The Chief of the Training and Operations Group directs all training and operations, The Chief of the Administrative Group is practically the Adjutant General of the Air Service, controlling administra-

tion and executive work, personnel, office management, the

tion and executive work, personnel, office management, the medical section, cables, correspondence, etc.

Brigailer General William Mitchell assumed charge of the common section sectio maintenance of the Training and Operation Group. The latter is the most important and has at its head the ranking officer among the branch chiefs—Brigadier General Mitchell.

Each branch chief is directly responsible to the Director of the Air Service, and in this manner the activities of the entire service are co-ordinated in and centered upon the office of

the Director

Again, following the overseas divisional system, the Director Agant, following the overseas missional system, the Lirector has designated the Supply from a first in the organization, and a substitution of the contribution of the

The primary purpose of this organization is to develop the Air Service, co-operate in the advancement of commercial aeronautics, and promote the principle that the United States deserves a leading place in the air, promised by our original application of the principles of mechanical flight.

TRANS-ATLANTIC FLIGHT PROGRESS

CTING Secretary Roosevelt announced that the de-stroyer Barney had been ordered to proceed to New-foundland to investigate the harbor facilities along the coast for the purpose of determining the best base from which the planes could put out overseas and harbors in which land-ings could be made in the event it became necessary for them to descend during the voyage from Rockaway to the flight

hase. Liest. Comdr. J. L. Kaufman will command the Barney, which is one of the most modern destroyers, and Commander which is one of the most modern destroyers, and Commander of the director of naval avainon, and Liest. E. P. Stone, of the coast guard, have been detailed to make the investigation. Unless difficulties with its close are encountered, the Barney is expected to return to the United States within about ten days. The officers will sulamnt their report at Washington.

The officer will calamit their report at Wassimutton. The officer will calamit their report at Wassimutton. Three of the four scaplanes with which the Navy Department plans to attempt its trans-Atlantic flight are now at the nawal air station at Rockaway Beach, from which the flight will start. They are known as the N. C. I type of machine. The fourth plane is under construction at the manufacturing plant of the Curtiss Airplane and Motor Corporation, in Garden City.

Minor changes are now being made in all machines at Rockaway Beach, lon it is expected that trial flights will be made within a week or ten days, and the actual trans-Alantic flight started soon after May I. At least two of the three machines at Rockaway leave already hown, Each of the three scaplanes there is equipped with three Liberty motors, having 1,000 to 1,200 combined horsepower. Experiments are now being made in the arrangement of the motors, but it is believed that the final choice will provide for two tractor, or "pulling propellers, and one "pushing" propeller.

properties, and one pushing properties. The fourth plane, two There will receive a label most offer plant of the Circumstance and the most offer plant of the Circumstance, and these will be arranged in the so-called "tandem type—that is, two tractor and two "pusher" motors.

The speed of the first three seaplanes has been estimated by the builders at 100 miles an hour, and it is said that at

least one of the planes has made approximately that speed in trial flights. The original gasoline consumption plan provided for a sistained flight of sixteen hours, but changes in design have allowed for largely increased storage space. Other changes contemplate lowering the pilots' station nearer

the pontoon, so as to render less dangerous the changing of pilots in flight.

Arrangements are said to be under way for the establishment of a line of destroyers along the route selected at in-tervals of less than two lundred miles.

tervals of less than two numbered miles.

Preparatory work is being done at Harbor Grace for the Handley Page Company in connection with the trans-Atlantic flight. The work is on a large scale, involving about \$50,000. One square-mile has been leased for twelve months and fences. barns, and other structure are being removed from the prop-

usaris, and other structure are being removed from the prop-crity. One hundred men will be placed at work on Monday clearing the property and huilding hangars for aeroplanes. Machines for the ocean flight are expected to leave Liverpool on April 13 on the Fruness liner Sachem, which will arrive here about ten days later. The flight is planned for the first half of May.

Colonel Ray Collishaw, a Canadian aviator, sailed on the steamship Olympic for England recently to bring back an aero-

steamsing Olympic for England recently to bring back an aero-plane with which to enter the trans-Atlantic contest. It levil a stempth is flight from Newfoundland early in May, accom-panied by Major McKever and a wireless operator. Colonel Collishaw expects to accomplish the flight in two thours. It is matchine will be equipped with five motors of the horse-power each, and will be capable of carrying fifty people and remaining in the air for thirty hours.

Captain Zuloaga, who crossed the Andes Mountains in a balloon in 1916, has asked the permission of the Argentine War Minister to attempt a flight across the Atlantic in an aeroplane. The captain is the Argentine military attaché in Paris. It is not known what type of machine he intends using.

It is stated that Major J. C. P. Wood will pilot a Rolls-Royce motored Short biplane, and that the Whitehead Aircraft Co. are secretly building a huge plane for the attempt.

Askial Age is gratified to amounce that it has accured the co-operation of Leelie V. Spencer, M. E. as a special contributing editor, whose writings will appear exclusively in this Spencer, M. E., as a special contributing editor, publications, will appear actionerly in this metallic and the property of th

aeronautic magazine.

Sale of Surplus Air Service Material

The Salvage Branch, Supply Section, in charged with entire responsibility in matters pertaining to the saic of all superioritism that the result of the salvage of the salvage of the salvage salvage of the salvage salvage of the salvage sa

Flying Field Ambulances

Flying Field Ambulances
The Training Section, Officer of the Director
At serve leids, an ambulance, with a medical
discr and necessary medical personnel, will be
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equipment will include view cutters, acce, for
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equipment will be held at a convenient place.
At a materies delich, an ambulance, fully
equipment, will be held at a convenient place,
medical officer, and other meessary medical permentical officer, and other meessary medical
period of the medical properties of the conmentical officer, and other meessary medical
period of the control of the control
details meessary to comply with the spirit of the
foregoing instruction.

New Commanding Officers for Kelly and Rack-well Fields

well Fields
The following named field officers were ordered to change station March 11, 1919, as follows:
Colored Henry II. Arnold, 1, M. A. A. S. A. ordered from Coronado, California, to Rockwell
Colord Junes, E. Freber, 1, M. A. A. S. A. ordered from Houston, Texas, to Kelly Field,
Colord Junes, F. Freber, 1, M. A. A. S. A. ordered from Houston, Texas, to Kelly Field,
Colord Henry C. Freit, A. S. A. ordered from Kelly Field, San Antono, Texas, to Washington,
D. T. G. Colord Henry C. Freit, A. S. A. ordered from Kelly Field, San Antono, Texas, to Washington,
D. T. G. Colord Henry C. Freit, A. S. D. Texas Colord Henry C. Freit, A. S. D. Ordered From Kelly Field, San Antono, Texas, to Washington,
D. T. G. Colord Henry C. G. C. S. C. S.

D. C. Lieut.-Colonel Leonard II. Drennan, J. M. A., A. S. A., ordered from Washington, D. C., to Chicago, Illinoia, for duty as Department Air Servire Officer.

Keep Sending Magazines Overseas

Keep Sending Magazhus Overseau.

Keneral Perhajing reports that the American
soldiers alread need reading nature more than the control of the

Raturning Aera Units

Tha War Department authorizes publication of Tha War Department authorizes publication of the following: the following: before the collowing: suited from St. Nassire, March 14th and is due to arrive at New York, March 27th, with the following troops: 504th Aero Supply, Squadron, 3 officers, 100ffeers, 181 men; 148th Aero Squadron, 3 officers, 181 men; 148th Aero Squadron, 3 officers, 181 men; 148th Aero Squadron, 3 officers, 181 men; 148th Aero Squadron, 4 officers, 181 men; 181 men;

Air Servica Attractive to Enlisted Men

Do you know that the Air Service of the Army pays more money to skilled mechanics than can be earned in eivil life? An automobile mechanic earns from \$3.50 54.50 per day, counting 26 working days per

Lealie V. Spencar, M. E., Jains Aerial Aga month your salary at \$4.50 per day equals

Contributing Staff \$117.00 per month. Your expenses are:

Board and room	\$35.00
Clothing (ontside)	8.00
Shoes, bats, underwear, c.c	3.00
Doctor's and Dentist's Bills, Hos-	
pital and medicines	5:00
Loss of time due to holidays, sck-	
ness, etc., 2 days per mon.h.	9,100
Loss of time due to lay off, lack of	
employment, vacations, etc., d	
days per month	

55 who have mechanical inclination, or who are skilled mechanics. Schools enable the Air Service Mechanics Schools enable to young apprentice to complete his education and become an expert traitesman, and qualify you for large earnings while in the service. Skilled mechanics are always in demand and ran save mointy through enlistment.

Congrassional Flying School

Congrassional Flying School:
The C. Smallington, D. C. March 24, 1910.
The C. Smallington, D. C. March 24, 1910.
The Congressional flying school, the anotest variators and Representations, has a new paper. Representation of the control of the con

What's In a Name?

(Written Exclusively for THE ARRIAL AGE WEEKLY.)

The securities the Government will issue in the Victory Loan will bear a different name from those in previous loans. They will be notes instead of bonds. What's the difference! Financiers may grasp a distinction. For practical purposes of practical people there is none. The Victory Notes will be promises of the Gov

eriment to repay the sum advanced for the nation's purposes, just as the previous issues of Liberty stonds were. They will bear a fair micrest as their predecessora did, and will be as and as the credit of the United States can

Laberty inoids were. They will hear a fate as wate as the credit of the United States can had then.

Note that the control of the United States can had then.

The control of the United States can had then.

The control of the United States can had then.

The control of the United States can had then been been dependent on the United States can had the control of the United States can had been control of the United States can have been control of the United States can be possible can be under the control of the United States can be possible can be under the control of the United States can be under the control of the United States can be under the control of the United States can be under the control of the United States can be under the control of the United States can be under the United States can be und

Hatf-Wing Observer's Insignia Unauthorized

Half-Wing Observer's Instead Unauthorized There is no official half-wing insignia, known to Lie Navy Department, hence the searing of an instead of the contract to regulations. There is also no Navy magnia for radio guinners or provide the contract to regulations. There is also no Navy magnia for radio guinners or provident to the contract to regulation of the contract to the con



Officers of the Teax-Atlantic Section at the Office of the Director of Naval Aviatine Opera-tions. Seasof in the certia—Comed. Jr. Towers, U. S. N., officer in charge. Studies light to right:—I.I. Comder. G. de C. Chevaller, U. S. N. officer in charge at liabon and assistant after of aparticular Comder. Hr. C. Rehardson, cantivertion corport LL Berratt, U. S. N. S. R. F. (See Section 1) and the Comment of t



The AIRCRAFT TRADE REVIEW



Director of Sales Reports Nanrly \$1,000,000 in Aircraft Sales

Washington, D. C.—An official statement of the Office of the Director of Sales, Wascopharts and the Company of the Company

General Diaqua with American International

Brig. Gen. Brice P. Disque, U.S.A., who re-ceived his discharge from the Army a short time ago, having served as director of the Spruce ago, having served as director of the Spruce pointed chairman of the export and import branch of the American International Corpora-tion, with headquarters in New York City, ac-cording to a press message from Fortland, Ore.

Personal Para.

F. X. Newman has resigned his position with the Wright-Martin Aircraft Corp., New Bruns dick, X. J., to become vice-president and sale manager of the Automatic Safety Tire Valve Corp., Long Island City.

Howard M. Benedict, who has been a licutenant in the Air Service, has been a licuten-ant in the Air Service, has been honorably dis-charged, and has returned to his position with the Oakes Co., Indianapolis. Mr. Benedict is connected with the pressed steel stamping de-

partments.

P. E. Berker, who was formerly experimental engineer of the Northway Motor Manufacturing Co., and more recently research engineer at the Aluminum Cashings Co., Cleveland, is now in charge of the truck and motor equipment department of the Van Dorn Iron Works Co.,

Grant of Land Offered Navy Air Service

Grant of Land Offered Navy Air Service Reflering that the U. S. Navy as in need of a large instant tract of land for the development of the control of the control of the control of the Forth Worth and Dallas, Trans, have jointly offered as a gift to the Navy Department for the control of the control of the control that the control of the control of the control offered in a letter recoved at the Secretary's offered in a letter recoved at the Secretary's of the control of the Avistion Division of the U. S. Navy for lighter-than air craft construc-tion of the control of offered in valued to a personnelly \$15,000. perment. Thately \$35,000.

85,000,000 Barrels of Gasoline in 1918

as,000,000 Barriels of Gasoline in 1918
Washington, March 25;—Gasoline production
the United States in 1918 was said by Van
Manning, Director of the Bureau of Mines,
have borne out at least in part the statement
a British Admiral shortly after the cessation
thotallines that "we floated to victory on a
set of vil".

A Bitth Jess than 30,600,000 barrels of gasoline was produced in the United S ates in 1916. Mr. Manning stated, while in 1917 the production was Manning stated, while in 1917 the production was 65,000,000 barrels, an increase of gason barrels, an increase of gason barrels, an increase of gason barrels, and increase of gason barrels, and increase of the period of t

Fliera Viait Perlas Islands

A cycle from France Field, Cristolal, Canal A cycle from France Field, Cristolal, Canal Ca

it is don for a first without not the operation of A report from two. Air Service filters who have been a first with the control of the contr



Mr. Fay L. Faurota, advertising managar of the Curties Aeroplana and Motor Corp., hy his energetic work, substantially contributed to the auccess of the Aeronautical Exposition

Efforts were made to penetrate still further in-

628 D.H-4 Planes at Front

(Prepared by Mathitics Branch, General Staff, War Department Morch 22, 1919)
628 De Haviland & Phanes Put in Service at The following table and diagram shows the status of production, this prenents and use overseas of De Haviland 4 service planes at the date of the artisticts.

Floated
Received at French ports
Assembled overseas.
Put into service overseas.
Put into service at front.
In commission at front.

Contracta Cancalad Up to March 19 Total \$480,000,000 The following is a summary of the value of cancellations and suspensions of contracts to March 14, 1412; totals, \$480,730,131.

1 alue of total \$150,400,482 52 167,554,396 35 19,852,379 4 13,832,902 3 Engines and spare parts. A Actoplanes and spare parts. Chronicals and rhemical plants Instruments and accessories Ballnons and supplies. Fairnes, lumber and metals. Miscellaneous

Total\$480,730,131 The Testing of Doper

The Testing of Dopes
In discussing the standard tests for testing of
dopes and the methods of determining uniform
depending and the methods of determining uniform
flexible productions discusses the metric of the
official tests prescribed
The test for informatishity in to place a sized.
The test for informatishity in to place a sized
The test for informatishity in to place a sized
to discuss the continuous described to the sized to
define the cube. It is stated that "the celluloid cube shall not justice some than a slight
clariting and the falter tieff shall not justice".
At regards the method laid down under the

above specification for measuring the rate of tourning, which is to ignite the edges of a hole tourning, which is to ignite the edges of a hole of the control of the contr

(3) Rate of horning if and when the faire, in granted address any placed coughly in their order of importance. If a dispo offers a greater residue, to find a situation to finance it may, as a greater risk, be considered from the control of the control of the control of the least resistance to financ, even though the latter than the control of the control of the control of the wings to horn gives the plot insufficient time. Crossoft, of the burning is of social artistic that it is easily extinguished by the wind, as the control of the control of the control of the control of greater value than one which is harder to of greater value than one which is harder to residily.

assuming it to spate more regulary, is probably increased assuming it to spate more regulary, in probably increased as the probably increased as the probably as the probably

fort. Should any one or here composed to the composite, however, the machine would be regarded to the composite than 0 per tent. If the composite the composite the composite than 0 per tent.



Berlin-Hamburg Air Mail Service

Berlin-Hamburg Air Mail Servicele an arrophane service was established between Berlin make two flights daily in both directions. On the first journey the machine only carried near papers, but in future letters will be carried, assume that the carried near the carried of the carried near the carried near the carried of the carried near the carri

Caproni Mail Servica Between Padua and Vienea

An aerial mail and passeoger service was in-augurated on Sunday, March 2, between Padua and Vienna. Caproni machines are being used, and two of these will leave each town every

and two of these will leave each town every three days.

The first flight on this service was made in four hours and a quarter, a distance of 304 miles being covered. The machinea were then piloted by Italian military aviators, and, presumably, they will continue to be employed on this service.

Swedish Air Traffic Co. Organized A company has been formed in Sweden under the title of the Swedish Air Traffic Co., Ltd., which has heen financed by the principal hanks of Stockholm for the purpose of establishing aerial traffic lines between Petrograd and London, via Stockholm, and Stockholm and Finland.

British-Dutch Co-operate to Establish Aero

With a view to establishing an aerial mail and passenger service in conjunction with Great Britan, five commissioners, who were seth by the Dutch Government, have arrived in England, or three months, and has made a great deal of progress in preparing for commercial seronautics in Holland. Several serodomes are in the course of consuction, including one situated wat Am sterdam which covers 250 acres.

Aircraft to Petrol Forests

Washington.—Major Gen, Menoher of the Army Air Service has been instructed to prepare necessary equipment, personnel and other facilities for esperiments in co-operation with the Department of Agriculture, in use of aircraft for forest fire patrol work.

Captured Bombers for Freech Mail Sarvice Captured Bombers lor Freech Mail Sarvlec Paris.—German bombing acroplanes of the Fredrichshafen type, which were surrendered inder a clause of the armster, will be used by the Department of Civilan Avatton in transport acroplanes will be equipped to carry three tonic of parents and bundles. Before the end of April the department plans to have moperation and acrtal pout between Paris and Valenciennes by way of Mashewa.

Royal Air Force Aerial Mail Services

For some considerable time past local miles For some considerable time past local miles from the past local miles past local miles from the past local miles which the past local miles which the past local miles and on other order. During the period from days on which no local services were run. Pure the past local miles This achem has now hen superseded by a

store claborate one, embracing a long-distance service from Marquise store Robosen/O right through to clapace, as well as a ceited service through to clapace, as well as a ceited service from milage, present peculiar difficulties where the control of the contro

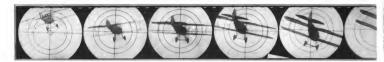
Each halloon will be marked with signs which the state of the state benefity, thus enabling the aeric marked to the state of the state of colours and the state of the state o

position. When the scheme is fully developed, the weather reports will be passed to the machines by wireless, by ground signals and by balloon signals, so that the pilot will know at each stage of his journey the conditions of the weather

spinsh is that the piots will now at each stage with the piot will now at each stage with the piot will not be ablent must be indeed must be indeed must be indeed must be country described above, and the time of the country described above, and the time of the result of the piot of the piot will be a piot of the piot will be a piot of the piot will be a piot will be a piot will piot will be a piot at each of the piot will be a piot will



A French Aerial Ambilance, built by Volsin Berthere, carries full heapital equipment in the inclusive mounted below the wings and shown open in the phatograph, Two powerful search lighta permit medical assistance to given at night and a special fuselaga is provided far carrying injured.



THE PHOTOGRAPHIC GUN

By EDGAR H. FELIX

Formerly Radio Engineer, Signal Corps

A the time of the currance of the United States into the war, British aviators were using a gun camera patterned stituted for the shoozing harred of the machine gun. This camera was designed to make twelve exposures at loading and for the aviator could only make one shot at a time, an interval being required to advance the film for the next exposure, and could take but twelve petities before reloading. With the true co-operative spirit that was evinced by all the Allies and vious experience in the war, the British authorities turned this gun camera over to our Army men, who in turn gave the Eastman Kodda Company orders to make a companience.

The improvements which our designers under on the British type resulted in the development of the camera so that axia-tors were trained to become expert aerial guanters in greatly reduced time without unnecessary waste of ammunition. The methods of training aviators in gunnery prior to the invention of the camera gun did not closely simulate actual conditions. It was customary to practice hitting clay pigeous from towers or elevated platforms equipped with standard machine gun experiments of the control of the

Another means employed was to use as targets balloons and parachutes dropped from a high altitude or kites towed from the ground and fired at from planes in flight. None of these marks, however, could perform arial acrobatics or move at the speeds encountered during aerial combiat.

the speeds encountered curring aerial comman. The British type of gun constituted a great improvement, for the aviator could now "fire" a camera, possessing a sight similar to that used on machine guns of types used on planes. The barrel of the gun, however, is much larger in diameter than the Lewis gun, for instance, and has a capacity of only

twelve pictures. To take a picture, it is necessary to pull the trigger, and then to advance the film by advancing a lever. The machine gun has to be removed from the ship to permit the fastening of the camera.

When a sample of this gun was submitted to the kodak company, one of the managers at once questioned the need of a heavy separate gun camera with its big Jens barrel. Why not lave a special camera attachment that could be Iastened, not be a special camera tactachment that could be engineering department was given the job of answering the question. Not only did they build a camera that could be attached directly to the gun in place of the ordinary ammunition magazine, but they also produced a camera that could gin, make them in "barsts," continuing fire automatically as long as the trigger is under pressure.

long as the trigger is under pressure.

The Gun Camera, Mark I, as it is officially called, weighs I3 pounds all told and has a lens harrel only 8 inches long the state of the camera in which is placed a strip of film, instead of heing circular as is the cartridge magazine of the machine gun, is oval-shaped; it is fitted with a Lewis gun magazine lock which completely fastens the magazine to the gun camera.

Each gut camera is ordinarily provided with three magazines which are loaded in a dark room. If the embryo fighting aviator, therefore, takes up with him these three magazines loaded to capacity he cam "shot" 300 times. The film in the magazine is ordinary motion-picture film, which travels from a speoil in the small end of the magazine past a light trap, and the small end of the magazine past a light trap, and is made to the magazine is 10½ inches long and 8 inches wide at the larger end.

Now in the Lewis machine gun after a hullet has been fired the gases resulting from the recoil eject the empty cartridge and automatically replace a loaded cartridge, so in order to



Mark I-A Gun Camera mounted on standard Lewis gun



continue fring all one needs to do is to continue pressure on the trigger. With the gun camera something must be substituted for the force of the cartridge charge, and so use is made of a spring which is wound up with a handle similar to that employed in winding up talking-machine motors. The spring is fastened directly to the shaft that turns the S-inch which causes an intermittent action, to the shutter mechanism in the lens harrel. Thus as the film is moved steadily past the light trap the shutter opens and closes for making the various exposures to show the location of the opposing across the continue of the co

To facilitate spotting the shot from the gun camera, a glass plate called a graticule is placed in the barrel at the focal plane in contact with the film. This plate is marked with a vertical and horizontal line passing through the center and and two large circles drawn close together describing the outer field covered by the camera. These circles and bisecting lines are impressed on the film at each exposure and the position of the opponent aeroplane is indicated by means of

Of course, one must realize that in aerial flights machines are going at tremendous speeds and the position of the opposing machine at the time of "firing" (making the exposure) is not quite the same as at the time the bullet reaches the machine. One can tell, however, fairly well by the direction the opposing machine was going as shown on the film whether it would have been hit in a vital spot or not. Thus if the machine is pointed toward the center or bisection of the lines

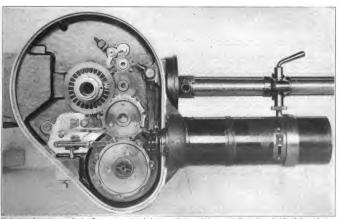
and is very close to the bisection, the chances of its having been hit would have been very good. If the machine had been shown in the same position with regard to the center point but going away from it, the margin of speed would probably just have saved it from being hit. In a straight pursuit a hit is indicated when some vital part of the machine covers up the center of the field. How the opposing aeroplane is shown camera is indicated in the illustration, which is a reproduction of a strip of film exposed in the gun camera from another aeroplane.

The gun camera is registered properly in relation to the sights of the machine gun to which it is attached by first sighting the machine gun sight on some definite point a certain distance away and their moving the camera so the point of the bisecting lines of the graticule fall exactly on the point on which the machine gun was sighted. The camera is then

securely clamped to the machine gun.

The latest improvement on this gun is the attachment of an ingenious timing device which indicates on the film the exact time to fifths of a second at which the photo was taken. was the exact time to fifths of a second at which the photo was taken. was the second of the property of the exact the

The Eastman Company has also turned out a line of aerial mapping cameras, of automatic and hand-operated types, using both films and plates. They, too, have constituted great advances over existing types.



Mechanism of gun camera, showing Geneva movement and shutter mechanism, which automatically continues to take photos as long as trigger is depressed

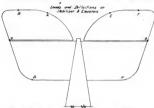
SAND TESTING OF AEROPLANES

By ALBERT S. HEINRICH

(Continued from page 160)
Test of Tail Surfaces

General Dimensions and Description

Figures 1 and 2 are sketches of the tail surfaces of this machine, and show full-size sections and views of some typical parts of the movable surfaces. The spruce ribs were held



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125	142	36	254	25	18	3	á	#	18	28	0	#
15	170	67	304	35	13	23	8	8	14	24	0	8
175	198	78	354	40	25	5	7	8	24	32	1	ź
20	226	89	404	50	25	5	1	1	25	3%	8	1
27 5	254	100	454	55	21	31	1	14	21	12	*	4
25	202	111	504	65	38	34	3	14	28	5	8	3
27 5	3/0	122	554	77	21	54	3	18	28	13	8	7
30	338	/33	604	84	38	62	8	18	3/4	54	7	1
329	366	144	654	Elev	afor /	Ap Fo	led			*		

Table 1-Results and pull at the controls for each leading of

in place by steel clips brazed around the leading and trailing edges, and screwed to the flanges of the rila. The elevators had sprace leading edges shown in section B-1, figure 1, and with brass brads. At the control mass in each case the ribs were built into a thick block of wood on each case the ribs were built into a thick block of wood on each face of which the mast was bolted. The trailing edges of the elevators and runder were of W", Zo gauge steel tubing flattened as shown



Figure 3-Arrangement for testing stabilizer and elevators

in the rudder elevation figure 2, and then wrapped with linen tape to prevent rust affecting the cloth. Each movable surface was held by small, hinges taking 3/16" clevis pins.

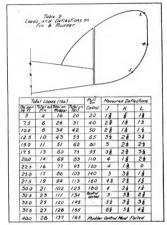


Table 2-Results and pull at the controls for each loading of the

The weight and areas o	f the surfa	ces are as follows:
Area of pin	1.37	5 covered wt. 2 lbs.
Area of rudder	6,66	covered wt. 41/4 lbs.
Area of stabilizer	11.44	covered wt. 8 lbs.
Area of elevators		covered wt. 71/2 lbs.
Weight of all fittings		4 lbs.

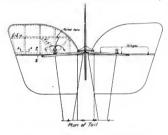
Procedure
The loading on the stabilizer should be uniform, but on the



Figure 5-Failure of rudder must at 40 lbs. per sq. ft. of loading

elevators it should be a maximum on the leading edge, and graduate down to nothing at the trailing edge. The loads should be put on in increments of 5 lbs, per sq. ft, ft or the first two loads, and 2½ lbs, per sq. ft, thereafter until failure of the surface seams. The same procedure is carried qut in testing the rudder and tail fin.

The photograph figure 3 shows the arrangements for testing, The complete fuselage with tail surfaces was set up and supported at the tail post and at front lift fittings by stands. Struts connected the stabilizer to the tail post, which was part of the fin, taking both tension and compression, as shown in figures 1, 2, and 3, and the control cables were connected up with the control in their proper relation. A block and tackle were rigged inside the fuselage, and fastened to the upper end of the ship, and through a 300-lb, spring balance to the top of the joy stick and end of the foot har for elevators and ruddertest, respectively. Before taking deflection reading on the tail surfaces, the tackle was manipulated so that the control masts had their original position, as determined by the position of a point on the control cable. The deflection readings, therefore, give a true indication of the distortion of the frame work of the surfaces. Loads were added as per tables 1 and 2 in



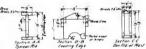


Figure 1,-Plan view of tall surfaces and salarged sections of typical parts of the movable surfaces



Three-quarter front view of the Victor Advance Training Plans

increments of 2.5 lbs, per sq. ft, and deflections taken at the points A, B, C, D, E, F, G, and H, as indicated in sketch at head of table 1. All loads were applied uniformly over the surfaces by means of sand bars.

Tables I and 2 give the results and pull at the controls for each loading. One of the elevators failed under a loading of 325 lbs, per sq. ft. Failure was in the box rib shown at C-6 figure 1, and in photograph figure 4, which broke off sharply where it was attached to the control mast block. The rudder failure was at 40 lbs, per sq. ft, when the top of the control

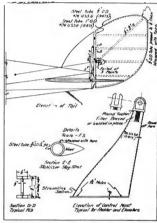


Figure 2-Side view of tail group showing outline and details of the

must broke off where indicated in figure 2, and as shown in photograph figure 5. When the fabric had been removed, it was found that failure had also occurred in the rib at the mast, and in the leading edge tube between the mast and the adjacent hinge, which evidently was caused by shock when the

control mast failed, as there was no evidence of failure in these places before the mast failed. Figure 6 shows the fuselage in position for rudder test.

	Elevators Ultimate load	W.T.	Rudder Ultimate load
Kawneer Curtiss J.N. 8	10	.08	20
Art Metal C.1 1.2	35	.65	35
Victor	32.5	6	40

These values and values for De H-4 and other machines show that the tail of the Victor Aeroplane is exceptionally strong for its weight, and perfectly satisfactory from a structural point of view.



Figure 6-Arrangement for testing rudders



Figure 4-Fellure at the elevator must bex rib, et 32.5 the. per

Aeronautical Commission Nearing an Agreement

Paris.—The Aeronautical Commission of the Peace Conference held a meeting March. It to receive and consider reports from sub-committees fround that the abscommittees also model that the property fround that the sub-committees also model completed their work, but the continuous approved the temporary reports submitted. to continuous approved the temporary reports submitted to be finally poliumited at the next meeting by the pice proposals to be finally poliumited at the next meeting by the pice Ministry and Legal sub-committee. Good progress has been made in other directions and a substantial agreement has been reached on important points in

connection with the future of commercial aviation.

THOMAS-MORSE S-7 TWO-SEATER

THE side-by-side seating arrangement of the Type S-7 Tractor permits conversation between the pilot and passenger without difficulty. The S-7 has been designed particularly for civilian use, special attention having been directed to confortable seating arrangement, there being ample room without crowding. The cockpit is lined throughout and in all respects the comfort of the occupants has been given

in all respects the comfort of the occupants has been given first considerations.

The S-7 is the first machine to be designed for side-by-side seating where a rotary engine is used and it is surprising to note the good streamline form which the body preserves. With an 89-hy, Le Rhone engine and its 322 square feet of lifting surface the machine can lift at a low a speed as 40 M. I. II, while having a possible high speed of 90 M. P. II. and the strength of the speed of

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Length					٠.		٠.										٠.										 				.2	ľ	6	•
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Height																											 				. 1	9'	0	•
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Type of engine,80 h.p. Le Rhone (air cooled rotary)
Engine revolutions per minute
Fuel capacity
Fuel duration at full power
Oil capacity4 gallons
Oil duration at full power
Propeller type
Topener type
Propeller diameter
Propeller revolutions per minute
Chasels
Type"Vee"
Wheels
Tires
Areas of Control Surfaces—(sonere feet)
Ailerons (four) 40.0
Elevators 16.8
Rudder 8.5
Horizontal stabilizer 14.5
Vertical stabilizer
Vertical stabilizer 3.0

Performance



Stick type control used.

Thomes-Marse Type S-7 80 H.P. Le Rhane engine, side-by-side two-sector, designed particularly for pleasure flying

SECOND PAN-AMERICAN AERONAUTIC CONVENTION AND EXHIBITION

To Be Held Under the Auspices of The Aero Club of America, The Aerial League of America and the Pan-American Aeronautic Federation.

> From Thursday, May 1st, 1919, June 1st. inclusive. Atlantic City, N. J.

Intercollegiate Contests Throughout the Summer

CONTESTS TO BE HELD EACH SATURDAY

- (1) Seaplane Contests (general).
- (2) Curtiss Marine Flying Trophy and Prizes.
- (3) Intercollegiate Seaplane Contests,
- (4) Land Aeroplane Contests.
- (5) Dirigible Contests,
- (6) Kite Balloon Speed in Ascending and Descending, and Maneuvering Contests,
- (7) Parachute Competition.
- (8) Aviette (bicycles and motorcycles with wings) Contests.

EVERY DAY ACTIVITIES

- (1) Exhibits of Aeroplanes, Motors and Accessories on the Steel Pier.
- (2) Demonstrations and tests of Scapianes, Land Aeroplanes, Motors, Dirigibles, Kite Balloons, to prospective purchasers and representatives of different gov-
- (3) Aerial Passenger Carrying by seaplanes and dirigibles, and kite balloon ascensions,
- (4) Moving pictures and Addresses by leading authorities on most important phases of aeronautics.

The Covernments and Aeronautic, Sporting, Scientific, Industrial and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are mixtude to send representatives to illustrate the world, excepting Germany and her allies, are mixtude to send representatives to illustrate the United States these Avenue, New York City, to register and receive their oficial budges and the official program. In the event that it is more conceined for them to go directly to elitonic City they well register at the offices of the Convention lotsted at the following Alanie City hostels: Host Traymore ter at the offices of the Convention lotsted at the following Alanie City hostels: Host Traymore Contents, and Alamae, Host Dennis and Host Illudion Hall all Markowship-Hinchien, Host Content, Host Alamae, Host Dennis and Host Illudion Hall all Markowship-Hinchien, Host Content, Host Alamae, Host Dennis and Host Illudion Hall Alamae that with the Content of the Aeronautic Committee will be at the Bureaus of the Aeronautic Contents, and above-named hostels and will sure the official budges which admit the bearer to the Aeronautic Hall, as well as the deep Exhibition on the Steel Pier, the judges' enclower during contests, and to the Aeronautic and motors yet.

be demonstrated.

All communications until May 1st, should be addressed to Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City. Entries for the competition should be addressed to the Chairman, Contest Committee, Aero Club of America, 297 Madison Avenue, New York City.



DAILY PROGRAM FOR PAN-AMERICAN AERO-NAUTIC CONVENTION, EXHIBITION AND CONTESTS

THURSDAY, MAY 1ST

Opening of Convention and Exhibit.

AFTERNOON—Reception at Aeronautic Hall on the Steel Pier. Addresses by United States Government State and aeronautic authorities.

EVENING-Aero Show and addresses by officials.

FRIDAY, MAY 2ND

AFTERNOON—Aero Show. Preliminary tests of seaplanes, dirigibles and kite halloons.

EVENING-Moving pictures and address on flying for sport and pleasure.

SATURDAY, MAY 3RD

AFTERNOON—Seaplane and dirigible races, and kite balloon ascending and descending contest.

EVENING-Ball.

SUNDAY, MAY 4TH

MORNING-Memorial service by eminent Divine for the dead airmen.

AFTERNOON AND EVENING—Reception to allied aces and heroes of the air and their parents, and announcement of the award of the Aero Club of America Medal of Valor, and the Aerial League of America Diploma of Honor.

MONDAY, MAY 5TH

AFTERNOON-First parachute contest for \$500 Bennett Prize.

EVENING—"The Large Dirigible and Its Value for Transportation." Representatives of railroads, express, steamship and other transportation organizations invited to attend.

TUESDAY, MAY 6TH

AFTERNOON-Illustrated addresses on "Aerial Forest Patrol." Forestry Department of every State

EVENING—"Work of Aerial Police Squadrons, and Why Every City Should Have One."

WEDNESDAY, MAY 7TH

AFTERNOON AND EVENING—Aerial Mail Day,
Illustrated address on, and consideration of,
"Aerial Mail Planes." (Thairman of Post Office
and Post Roads Committees of House of Representatives and Senate, and Postmaster General
Burleson invited to deliver addresses. (Z6,000
United States Postmasters, and Chambers of
Commerce of 13,000 cities invited to attend.)

THURSDAY, MAY 8TH

AFTERNOON AND EVENING—Illustrated addresses on the "Need of Municipal Aerodromes, and the Part to be Played by Aircraft in City Planning." Chambers of Commerce and City Planning Commissions of 13,000 cities invited to

FRIDAY, MAY 9TH

AFTERNOON-Arrival of seaplanes and army planes from Army and Navy Air Stations. Second parachute competition for the \$500 Bennett Prize.

EVENING—Illustrated addresses on "Latest Develop-ments in Aerial Warfare and Adventures in Aerial Warfare," told by famous aces.

SATURDAY, MAY 10TH

AFTERNOON-Army, Navy and Marine Corps Day. Aerial contests and tournament,

EVENING-United States Army and Navy Officers' Reception. Reception and addresses at Aero-nautic Exhibition Hall on the Steel Pier.

SUNDAY, MAY 11TH

SURUNAY, MAY 111H
AFTERNON AND EVENING—Presentation of
the flags by each State of the United States to
the flags by each State of the United States to
Each State will present a flag to each 'Aero
Squadron, the members of which were overwhelmingly natives of that State. The presentation of the state of the state of the state
State and the Aero Club and Aerial League
branch of that State. All States and cities invited to send delegates, and Army, Navy and
Marine Corps to send representatives.

MONDAY, MAY 12TH

AFTERNOON—Demonstrations and illustrated ad-dresses on the "Value of Aircraft for Advertising by Day and by Night." All national advertisers and advertising agents invited to attend.

EVENING—"Pan-American Aerial Transport Over Land." Addresses by members of the commis-sions of the 20 Latin-American Republics.

TUESDAY, MAY 13TH

AFTERNOON AND EVENING—"Pan-American Aerial Transport Over Water." Addresses by members of the 20 Latin-American Republics' Commissions.

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH

AFTERNOONS AND EVENINGS-"The Airways and Aerial Transport in Europe, Canada, Africa, Australia and Asia."

FRIDAY, MAY 16TH

AFTERNOON AND EVENING—"Aerial Naviga-tion Instruments for Flying Over Land and Water." Aviators, navigators, scientific instru-ment makers and aeronautic experts invited

SATURDAY, MAY 17TH

AFTERNOON-Aerial races and contests. Illustrated addresses on Aerial Photography,

EVENING—Extensive exhibit of aerial photographs and photographic apparatus. All photographers, professional and amateur, and makers of photo-graphic apparatus invited. SUNDAY, MAY 18TH

AFTERNOON AND EVENING—Illustrated ad-dresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey."

MONDAY, MAY 19TH

AFTERNOON-Addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Avi-

EVENING--Illustrated address on "How Army Medi-cal Standards and Inspection Lessen Accidents." Insurance companies and agents invited.

TUESDAY, MAY 20TH

AFTERNOON AND EVENING-Illustrated addresses showing different ways of crossing Atlantic by air and the problems to be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST

AFTERNOON—Aero Safety Day. Discussion of aero safety provisions made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in

EVENING-"Progress Made in the Art of Piloting Aeroplanes." Illustrated

THURSDAY, MAY 22nd

AFTERNOON AND EVENING-Addresses and discussions of meteorology—"How the Weather Forecasts Can be Extended and Made More Ef-Forecasts Can be Extended and Made More Es-ficient by the Use of Aircraft in Exploring the Upper Air," also "How the Weather Forecasts Help Aerial Navigation," and "Telegraphic and Climatic Factors in Relation to Aeronautics.

FRIDAY, MAY 23RD

AFTERNOON AND EVENING-Addresses on "Aerial Jurisprudence—Aerial Laws and Regula-tion of Air Traffic." (First day.) Lawyers traffic commissioners and police authorities of different countries invited

SATURDAY, MAY 24TH

FTERNOON—Races and contests.

VENING—Illustrated address on "Need of Establishing Altitude Levels for International, Interstate and Interurban Air Travel."

SUNDAY, MAY 25TH

AFTERNOON AND EVENING—Aeronautic Art Day, Address on 'Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paintings,' by Lieut. Farre, Lieut. Ruttan and others. All prominent artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK.

MONDAY, MAY 26TH

AFTERNOON—"Aeronautic Engineering Prob-lems and Their Prospective Solution."

EVENING—Opening of contests for designs and

ideas for large aeroplanes.

TUESDAY, MAY 27TH

AFTERNOON—"Factors That Increase the Efficiency for Large Dirigibles." EVENING—"Advantages of Veneer and Plywood for

Aircraft Construction WEDNESDAY, MAY 28TH

AFTERNOON-Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective EVENING-"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON—"Flying Boats Versus Hydroaero-planes for Sport and Transportation." EVENING—Contest for designs and ideas for large aeroplanes

FRIDAY, MAY 30TH (Memorial Day)

AFTERNOON-Dirigible races, kite balloon speed ascending contest; parachute contest EVENING-Reception at the Aeronautic Hall, Steel Pier

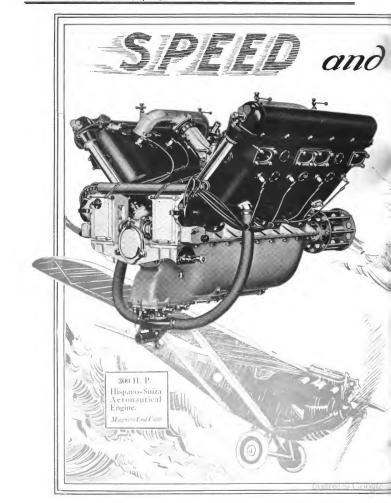
SATURDAY, MAY 31ST

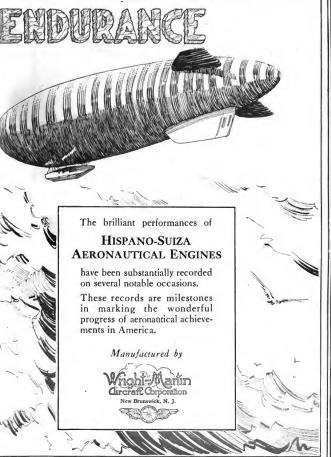
AFTERNOON-Seaplanes, land planes and dirigible contests. Aviette competition at which all cyclists and makers of bicycles and motorcycles will be

and marks in vision and property in the control of the control of

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING-Award of prizes and diplomas for all events,





and Google

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Air Service Demobilization

Commercial Aerial Transportation Concerns will find it to their advantage to write to

The Aerial Register

(To appear shortly under the auspices of AERIAL AGE WEEKLY)

For NAMES and QUALIFICATIONS of

Pilots
Meteorologists
Aerial Navigators
Aerial Surveyors
Aerodrome Managers
Engine Specialists
Aerial Photographers

Aerial Traffic Managers
Aircraft Inspectors
Wireless Experts
Instructors
ers Airship Pilots
Rigging Specialists
ers Aerial Statisticians
Equipment Experts

And for INFORMATION CONCERN-ING COMMERCIAL AERONAUTICS

IN ANY PART OF THE WORLD

If YOU hold any of the above qualifications, but have not yet registered, you are invited to communicate with the Editor (Air Service Demobilization Department) AT ONCE.

280 MADISON AVE., NEW YORK

Second Lieut. John MacArthur, who brought down three planes on one day and two on an-other, is now rated as an American acc. His record was discovered in the following French

record sas discovered in the following French containing, just records and Archur, 27th Acro"Second Lieut. John MacArbur, 27th Acro"Excellent Girer possessing in the highest degree the sentiment of days. In the courte of t

103rd Aero Pursuit Squadron Officially Cited APPO FURSUIT SQUAGFON Officially Cited On December 23, 1918, the 193d Aero Pursuit Squadron, formerly the Escadrille, was disband-ed. Its last citation from the commanding offi-cer is of interest.

Headquarters, 103d Aero Pursuit Squadron, American E. F. December 23, 1918.

General Order No. 23:

1. This date the 103d Aero Parsuit Squadron dispatched without mishap all its aeroplanes to the First Air Depot, thus successfully terminating our major responsibility as a combat unit in the American Expeditionary Forces after nine membra of sucies constations.

in the American Espoditionary Forces after thise membs of active operations.

2. At this time it is my earnest desire to express senerely and fully to each and every member of the command, both officers and men, my willing services and seminote on the command to the command of the command o

willing services so nobly and splendidly per-John February, 19th, the enlisted personnel of the 19th Aeros Parsani Spandron, joined the first person of the person of the 19th Aeros Parsani Spandron of the 19th Aeros Parsani American, that conscientionally and heavyl array American, that conscientionally and heavyl array to the person of the 19th Aeros Parsani American, that conscientionally and heavyl array the Experts, the Sixth, the DAA, and the the Fourth, the Sixth, the DAA, and the true in the Flanders sector where you were able true in the Flanders sector where you were able to prepreture the name of the old Ladyvite colors and brought added glory to its flag and the properties of the same of the old Ladyvite colors and brought added glory to its flag and colors and brought added glory to its flag and colors and brought added glory to its flag and colors and brought added glory to its flag and colors and brought added glory to its flag and colors and brought added glory to its flag and colors and brought added glory to its flag and gas and the surpose of the colors and the colors and the gas and the surpose that of the colors and the colors ity in a sector where the whole personnel was gainest the strongers kind of enemy areal activi-ty in a sector where the whole personnel was

the air without affecting its morals or despeting for the first time under the immediate direction of the American Array, and from them until the other than the same indominable courage, tircless with the same indominable courage, tircless considerable that the same indominable courage, tircless considerable than the same indominable courage, tircless considerable than the same indominable courage, tircless and part of the courage that the same indominable courage, tircless and part of part of part of the courage that the same indominable courage, the courage that you Spanish with which the same indominable courage, the same indicate that the same indicate the same indicate

Captain, A.S., U.S.A., Commandin Demobilization of Overseas Personnel The net decrease in personnel overseas since January 30, is approximately 12 per cent, against a net decrease of 25 per cent in the United

reaces	In U. S.	Oversea
Nov.	11	78,786
Nov.	18	78,973
Nov.	25	78,361
Dec.	2	78,061
Dec.	9	70,040
Dec.	21	61,245
Dec.	26	59,917
Jan.	667,833	59,584
Jan.	1651,821	58,854
Jan.	23	58,133
Jan	3041,314	57,527
reh.	6	56,299
Feb.	11	54,802
Feb.	20	53,604
Feb.	2731,111	53,087
Mar.	630,823	50,743

Aircraft Production Demobilization of Personnel

According to reports received from the Bureau of Aircraft Production, the net decrease in the total commissioned and enlisted personnel from November 15 to March 11 was approximately 94 per cent.
The distribution and per cent. of net decrease to March II are shown below:

Per cent of net Nov. 15 Mar. 6 decrease Officers 1,898 Enlisted soen., 30,622 1.382 To al 32,520 2,031

Air Service Reorganization onnection with the reorganization of the Air Service, Major General Charles T Menoher, has pointed out that the system of staff organization, used overseas, was followed. The Director of the Air Service is assisted by an executive officer who is his official mouth-piece, being authorized to sign his name and act as his general executive.

Orders No. 5, issued March 19, 1919, by the Director of Air Service, gives the following detailed information:

under information:

J. In naming the various subdivisions of this fine, the following terminology will be used:
the first of the firs (e) Subordinates reporting directly to Section Chiefs will be known as Branch Chiefs.

tion Cheefs will be known as Branch Cheefs. Should any further subdivisions be required, proper designation of the subdivision for formed of the control of the the control of the subdivision of the control of the con

tion outlined in Orders Nos. 1 and 2 of this constitution of the carefulsion of contracts and the approval or authority for funds contracts and the approval or authority for funds of the contract of the con



Editors of the Rich Field Flyer gave a dinner to General Beaumont B. Buck, hero of Catigny, at Waco, Texas. Major John J. Whitesides, commanding officer of Rich Field, acted as toastmaster



FOREIGN NEWS



American Seaplanes Make First Flight in Kingsten, Jamaica Combined and Combined and

Belgian Government Announces a Paria-Brussels Service

Belgian Government Anneuscea a Parti-Brussis Service The Belgian Foreign Minister amounted on February 26, says The Belgian Foreign Minister amounted on February 26, says of provisional organization is already formed. The arroplance, such capable of carrying 12 passengers with linguage, a pilot, and mechanics, up going so far as to possess a small lithers, and a lar! The price of a journey between Pars and Brussets—which includes as a company of the property of the property of the programmation, which is expected to run a service between Amster-tian, Astorept, Lelle and Fatra, and these to Bourleau and Nicer.

Italian Mission to Argentina Takes Planes and Dirigibles

Halian Mission ta Argantina Taken Flanes and Dirigibles
An mission for premoting better trading relations in Argentina has
a small Neval submaries bunting airchip. The former mashines
incided as N. V. A hydra-exception, a small [Ax], something from
enotide as N. V. A hydra-exception, a small [Ax], something from
moder craft, and the airchip, it is stated, is a Usualli product.
The well-known plots composing the mission are all mean in the
one, though our hopes that much trade may directly or indirectly
better craft of the trip.

Four-Matured Plane for Trans-Atlantic Flight Entered by Dawson

Four-Matured Plane for Trans-Atlantic Flight Entered by Davion It is understood that the John Dawson Co., Lid., of Neveralities on Tyre, has entered a four-regimed association designed by Mr. C. The ene machine is said to have a page of 10 ff, and a length of 54 ft, 6 ins., and a speed of 120 130 miles as hour is intended, will be arranged in pairs in tradeom on either side of the fuseless, each pair driving a tractor airsecse. During the attempt on the passenger, and care has been taken to remote the accommodation as confortable as possible, the interior of the machine being heared by the exhaunt system.

A Cambridge Chair of Aeronautical Engineering

A Cambridge Chair of Avenoustical Engineering
The following paragraph has opported in the daily Frenchof 5 per
cent, was stock from Mr. Emile Mond, of Hyde Pask Square, for
cent, was stock from Mr. Emile Mond, of Hyde Pask Square, for
mountain to his own, Letter, Francis Mond, Eff. A. And R. A. F., who
was killed in action whilst frying on the Western front on May
The Chair is to be designated the Francis Mond Professorish
The Chair is no be designated the Francis Mond Professorish
The Council of the Seaste recommended that the offer he gratefully
accepted. The proposal is viewed with favor by the Air Ministry.

Unfavorable Air Conditions Off Newfoundland

Unfavarable Air Conditions Off revisionanana london—Warning to beaver of "air rest" of Kewlondiland ac-companied meteoriogical details furnished by the British admirally and the meteoriogical bureau, it was learned, has been sufficient R-33 and R-34, for their flight to America. It has just been dis-covered that a permanent wind area of "air rest" in the trans. Atlantic route between Ireland and Newfoundland makes the success of even the most powerful ariship dishons.

London-Amaterdam Servica to be Inaugurated

Plans for an earl post between London and Amsterdam have been drawn up by a bloth sensibly company, according to the Teleparal, the third plans to the the third plans to the the third plans to the third plans to the the third plan provide the third plan provide for the establishment of an earlier criptical. A life time bours, and that a capital of about £33,000 will be required. A life tool plan provide for the establishment of an earlier criptical plans to the capital plans to the capit

Air Ministry to Conduct Exhibition Tour Through Europe

"minutering consider canadination for more gas acceptance as series of aerosphane flights to various parts of the world to demon-strate the excellence of British aerosphane. The first flight will prob-ie expected that the machine will be a gaint Handley-Page bisphane of the type which flew to India recently. Other flights in contemplation to 10th, and 10th are 10th and 10th and 10th are 10th and 10th a

Aviation School in Paru

Lima, Peru. A military aviation school will be established in Peru, according to a recent decree by the president of the country.

Canada Contributed 8,000 Air Officers

London.—C. Canada Cantributed 8,000 Air Officers.

London.—C. Canada Cantributed 8,000 Air Officers.

Royal Air Scale State 10, 100 artistion officers overseas to join the Royal Air Scale State 10, 100 and 10,

Another British Entry in Trans-Atlantic Flight

Lambra-Aastber British Entry in Trans-Atlantic FIFS's the Dairy Mail for the first fight from the Allantic FIFS's the Dairy and for the first from the first from the Allantic sea made today in behalf of Maj. J. C. P. Wood, plot, and Capt. C. C. Withen suvergers. They propose to make the attempt in the first first from the first from the Allantic Company of the Allantic Company of the Allantic Company of the Allantic Company of the Company of the Allantic Company of the Company of the Allantic Company of the Com

Argentine-Paraguayan Air Route Buenos Ayres, Argentina, March 24.
—Italian aviators have arrived here to establish an aerial communication system between Buenos Ayres and Ascuncion, the capital of Paraguay.

R-34 nn 19 Hour Tast Flight R-34 an 19 Hour Tast Flight London.—The British airship R-34 returned to her base on the Clyde at noon after a flight which kept her in the air continuously for nineteen hours. The timerary included a flight to Dublin, the circling of the lade of Man, and home by way of Liverpool and the Midlands by way of Liverpool and the Midlands at the Clyde Company of the Clyde Company to the Clyde Company of the Clyde Clyde Clyde Company to the Clyde Company of the Clyde Cly

The Evening Standard says that the neat flight of the ship will be over the ocean to make certain tests. An attempt will then be made to cross the Atlantic,

Italian Enrianini Carries 46
The Forlation 6, which was ready in time to that into 6, which was ready in time to that in the season of the forlation of the for





ELEMENTARY AERONAUTICS

MODEL NOTES Dy John F. MSMahon

PACIFIC NORTHWEST MODEL AERO onna Boulevard, Seattle, Wash, Y RIDGE MODEL CLUB Beulevard, Bay Ridge, Brooklyn UNIVERSITY AERO SCIENCE CLUB

Bloomington. Indiana ROADWAY MODEL AERO CLUB 13 North Brandway, Baltimora, Md RIANGLE MODEL AERO CLUB Baltimora, Md. NEBRASKA MODEL AERO CLUB

E-62 X CLUBS

ER MODEL AERO CLUB OIS MODEL AERO CLUB uditorium Hotel, Chicago.

AUKEE MODEL

CONCORD MODEL AERO CLUB AERO CLUB OF CAPITOL MODEL AERO CLUB 1726 M Street, N. W., Washington, D. C. Washington, D. C.
CORRESPONDENCE MODEL AERO CLUB
330 N. Main Street,
Rockiford, Illa.
AERO CLUB OF LANE TECHNICAL,
HIGH SCHOOL
Sodgwick & Division Streets, Chicago, Ill.

The Motorcycle Engine Driven Aeroplane

AHIS machine was described and the description accompanied by a cut drawn to scale in last week's AERIAL AGF.
All the dimensions could be ascertained by using the scale at the upper left-hand corner to determine the size of wings, fuselage, etc.

The sizes of struts and longerons in the body can be determined by scaling the body and deducting the thickness of the when determining the lengths of the struts, and allowing for the curves when measuring the longerons.

As I mentioned in a previous article, this three-cylinder motor can be built from three ordinary stock motorcycle cylinders, pistons, connecting rods, valves, etc.; the only thing necessary would be the crankcase.

The ordinary motorcycle motor uses a crankcase having but two holes for the cylinders; this one will have to be provided with three holes, spaced at regular intervals around the outside circumference.

outside circumterence. It is no easy matter for the ordinary mechanic to construct one of these crankcases, and for this reason I have made arrangements with one of our advertisers to make up these crankcases, which are now being developed, and when ready announcement will be made in the advertising columns of this

For those who wish to attempt the construction of one of these motors the writer will show a sketch in next issue of the general assembly of the proposed motor.

general assembly of the proposed motor. Cylinders from an Indian, Excelsior, Harley-Davidson or Reading motorcycles can be used. The Hendee Manufacturing Company claims for their motor 18 horsepower when running at the maximum speed, and being that we are using three cylinders instead of two we should get at least half again as much power, or, as stated hefore, 27 horsepower, which gives us a good bit of reserve horsepower for climbing and maneuvering.

Unless a reduction gear is built into the crankcase it will be necessary to use a very low pitch propeller which is not be necessary to me a very low pitten propener when it is over efficient. When the rest way would be the head of the control of the crankshaft and this turning a gear three times the size, to which is fastened the propeller-shaft. The most difficult part will be the arrangement of the valve

The most difficult part will be the arrangement of the valve timing apparatus and the ignition, which in a three-cylinder engine must be very ingenious. The order of firing of the cylinders being 1, 3, 2, which you will see means that one cylinder is skipped on each revolution and the motor has one

and one-third power impulses each revolution.

For the information of those who did not receive a copy of the first instalment, the fittings which were designed for the Ford motored aeroplane can be used on this machine as well, and also on a two-cylinder ordinary motorcycle engined ma-AGE.

The Aero Science Club of America

Just in time to enter the coming model aeroplane contests, the Aero Science Club of America has signified its intention of again reorganizing with most of its old members and many new ones on its membership list. This club is the oldest model Aeroplane Club in America, and has graduated some of America's greatest aeroplane mechanics, designers and fliers

The Aero Science Club was formerly known as the New York Model Aero Club, and was the first in the United States to hold an engine driven model aeroplane contest—the motors being the "Baby" engine constructed of aluminum and having but one cylinder. Such famous aeronautical men as Carisi, Schober, Peoli and Lateiner, as well as a few others whom I cannot remember, competed. These men, with the exception of Peoli, who was killed in the South a few years ago in an aeroplane of his own design, are holding responsible positions in aircraft factories to-day, showing the benefits derived from model aeroplane competition,

More attention should be given to the engine driven model than is displayed by the model enthusiasts, because better prizes will be offered for this type of model than those offered for the rubber-driven type, and the rules allow the model builder to huy his power plant as long as he makes the re-mainder of the model.

Compressed air and steam engines can be purchased from model aeroplane supply houses for nominal sums of money.

Notice to Builders of the Ford Motored Aeroplane

The Jennings Machine Works, of Uniontown, Pa., one of our advertisers, announce a full line of parts for the Ford motored aeroplane recently described in these columns. These motored aeroplane recently described in these columns. These parts age made very strong and carefully as well as neat in appearance, each fitting being dipped in black aeroplane enamel, which appeared as those which were given extend to which appeared as those which were given mechanic to make them; while these made by the above company are a strict factory production. Control stick, oil pan, propeller hab and special radiator are the other parts that are sold by this concern, as well as the fittings. Machine work and motor parts can be furnished.

Mr. Henry S. Villard Offers Cup

Mr. Henry S. Villard, of the Aero Club of America, has offered his cup for competition again. Aero Club has two legs on this cup, and if they win it again it is theirs, the rules by which it was presented for competition being the club winning it three times was to get possession of this beautiful trophy, which is now on exhibition in the Aero Club of America rooms,

Mr. Villard is quite an enthusiast, and believes the model eroplane is the correct method of studying mechanical flight. He is even more interested in the mechanical motor driven models of the compressed air and steam engined type,

Many entries are listed for the coming contests, and I would advise those young men who are alone in their towns or cities to get together their friends and interest them in model aeroplane flying, as it is necessary to have at least five com-petitors for the flying models contest. The construction and exhibition models can be entered separately, as they will be judged by the photos and the certification accompanying the photos. Get husy, model enthusiasts, as the time is drawing near.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flightly," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and easy victim has a different story to tell. When you finish this column YOU may be infected, case and easy a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Institute of the printed when requested.

A Grand Passion

"She seems interested in that aviator."
"That is hardly the word for it."

"No?"

"She says she loves the very air he flies through."

Lots of Such Cases We're Thinking

An Airnat sent his girl in Indiana a photo of himself. One year later when he returned to the land of the free, he was talking with his girl one night.

year later when he returned to the land of the life, he webstalking with his girl one nigh, "you never did tell me whether." "Oh, by the way," he says, "you neever did tell me whether you received that photo I sent you about a year ago." "A photo," she exclaimed, "why, I thought that was one of those puzzle pictures in which you try to find a man's face."

There was a young flyer named Perc. His flights grew from reckless to worse. He lost his control

And all his petrol— He now rides around in a hearse.

An Aviator's Description of a Fair Damsel at a Dancing Party

She was some 5 ft. 4 in. OVER-ALL LENGTH, TRAC-TOR TYPE, designed somewhat after the Mary Pickford model, faultlessly STREAM-LINED, and her features were slightly radical in design, but showed a very good ASPECT RATIO.



On the Chanute and Bell Airway in 1922-Courtesy N. Y. Globe

was sarefully covered with the linest quality FABRL and her LONG-KONS so designed as to give equisite effect, She had a stately and well spring UNDERCARRIAGE OFF was very noticeable, although she had a slight DUTCH ROLL and a peculiar PITCHING MOTION at first, but she quickly assumed her PROPER POSITION.

In an attempt to test her CONTRUS, together with her RESISTANCE, the CRITICAL ANGLE was found and she started to STALL, giving the observer a beautiful example of HANDS OFF, which immediately showed sufficient FACTOR OF SAFETY.

Owing to a sudden RETREAT a large GAP must be left in the details of description, which leads us to suspect a WARPED disposition.

WARPED disposition.

Although one of the PILOTS reports that she was so PERFECTLY ALIGNED that she responded very quickly to the CONTROLS, especially in a SPIN, and she readily assumed her GLIDING ANGLE,—The Propeller.

Huh-uh! Not Me

By An Officer at Scott Field Co'se, Ah ain't sayin' Ah won't do Des what ma country want me to, But dey's one job dat Ah fo'see Ain't gwine to 'tach itself to me— Huh-uh, not me.

Dat's dis heah ahplane stuff—no boss, Ah'll pack some othah kin' oh cross Lak, drive a mule, or tote a gun, But Ah ain't flirtin' wif de sun— Huh-uh, not me.

Ef Ah mus' do a loop de loop, Let mine be roun' a bowl ob soup; 'Tain't gwine to be up whah de crows Kin say Ah's trompin on deh toes— Huh-uh, not me.

It sho look sweet, Ah don't deny, To be a-oozin' roun' de sky, But dat's fo' folks dat's in de mood To pass up love an' gin an' food— Huh-uh, not me.

Down heah Ah firs' saw light ob day, Down heah am whah Ah's gwine t' stay; Folks, Ah don't keer to hah ma feet Get too blamed proud t' walk de street— Huh-uh, not me.

So, Ah'll des wait till Gabr'el brings Dem good ole-fashioned angel wings, Den as Ah pass de ahplane by, In pity, Ah'll look down and sigh— Hull-uh, not me.

Missouri Freemason.



Vol. 9, No. 5

APRIL 14, 1919

10 CENTS A COPY



A Thomas Morse S4C Single-Seater Scout Makes a Landing

First Air Port in World Established
at Atlantic City



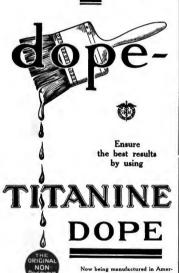
Duesenberg

The Power of the Hour

Duesenberg Motors Corporation 120 Broadway New York City

Much depends

on



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Manufacturers of
Aeroplane Dope Finishing Varnish
Pigmented Varnish Identification Colors
Planoline Fireproofing Solution
Dope Resisting Paint



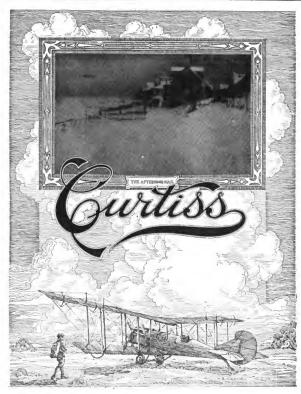
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A drag AIRMAN BRINGS MAIL IN BLINDING SQUALL BY AIRMAN BRINGS MAIL IN BLINDING SQUALL BY AIRMAN Special to The New York Times the re-bookbab Mailer, a former navial existence, made the trip from Philadel-By Airman St.—A Curtiss, piloted by John N. Wallier, a former navial existence, made the trip from Philadel-By Airman St.—A Curtiss, piloted by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate, and delivered by John N. Tork, when the Alasake seaborate is the trip from Philadel-By Alas

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H. B. CHILDS

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VOL. 1X

NEW YORK, MAY 5, 1919

NO. 8

SECRETARY OF WAR BAKER OPENS SECOND PAN-AMERICAN AERONAUTIC CONVENTION, EXPOSITION AND CONTESTS BY WIRELESS

HE opening of the Second Pan-American Convention, Exposition and Contests at Adantic City on May 1st was an even greater event than the memorable First Convention which was held in New York two years ago and was opened by President Wilson by wireless from the White House.

The opening ceremony at Atlantic City on Thursday was a most impressive event. Thousands of representatives of different countries, government, state, civic and aeronautical authorities and famous airmen were present on the Steel Pier and the Atlantic City Municipal Air Port on Albany Avenue, Atlantic City.

Secretary Baker Opens Event by Wireless

Secretary War Newton D. Baker opened the event by a wireless addraward and the work of the

American contribution is valuable and significant.

"(Signed) BAKER, Secretary of War."

Other messages were received by wireless, cable and mail from over one hundred authorities throughout the world. A

few of the messages follow:

The Second Pan-American Aeronautic Convention and Exposition comes at a time when it cannot fail to be of vast benefit to the course of aeronautics in North and Sun America. The Aero Club of America, the Aerial League of America and the Pan-American Aeronautic Federation are doing an excellent work in staging this important, event and deserve the support of a progressive people of North and South America.

REAR ADMIRAL BRADLEY A. FISKE, U.S.N. (Retired).

Not since the ending of the war has there been anything so auspicious for the cause of aviation as this Pan-American Aeronautical Convention and Exposition. Substantial results making for the progress of aeronautics in the new world are bound to come from this important gathering.

Major Thomas S. Baldwin.

North and South America again joins hands for the advance of aeronautics in the Second Pan-American Aeronautical Convention and Exposition being held at Atlantic City. The three organizations under whose auspices this im-City. The three organizations under whose auspices this important event is taking place are to be congratulated on the warm spirit of co-operation existing between them that makes possible the grand success of such an immenue undertakine, of all the countries of Pan-America until all these countries are knit by airways and these airways term with planes and dirigibles, so that not only the industry itself will be on a basis of stable and steady development with all the peoples of the Western Hemisphere more closely knit in mind and heart and deed for the advancement and protection of our common civilization.

SANTOS-DUMONT.

Atlantic City is destined to become the Aeroplane City of America. Everything is pointing in that direction.

SAMUEL P. LEEDS,
President of the Chamber of Commerce, Atlantic City.

It gives me pleasure to extend a hearty greeting to the thousands in attendance at the Second Pan-American Exposition and Convention. This event marks another epoch in Pan-American Aeronautics and makes for the continued covancement of the great art of avaision.

The recent war has shown the necessity of aerial preparation, and nothing will do more for the protection of the Western Hemisphere in future wars than a strong and united effort in the upbinding of every phase of aviation in all the Convention are lound to be of far-feaching benefit in the furthering of the cause of aeronautics. furthering of the cause of aeronautics.

ALAN R. HAWLEY, President of the Aero Club of America.

The atmosphere is the greatest thing on earth. It is a great occas, a weeping unbroken around, the entire globe. Acrograd occas, for travel and transportation of all kinds. The stabilishment of great acrial highways and of an aerial Coast Patrol Taking in all the countries and the coasts of the Western World is a great end to be achieved. Such events as this Pan-American Exposition and Convention will greatly add in furthering these desirable ends. REAR ADMIRAL ROBERT A. PEARY, U.S.N.

Good Start for Contests

Ten aviators were ready to participate in the contests on the first day and a number started in different parts of the country, and the flights are in progress as AERIAL AGE goes to press, complete reports of which will be given in the next number of Afrial Age. Port is a regular beehive. The Atlantic City Municipal Air

Remarkable Exhibits on the Pier

The governments of all the Allied and Latin-American countries and their aeronautic, sporting, scientific, industrial and educational organizations have sent commissions to the convention. Five hundred thousand people have been invited to attend. Aeroplanes constructed on bird lines and painted in color resembling birds is one of the striking new developments in aeronautics which will be witnessed at the Second Pan-American Exposition on the Steel Pier and at the At-lantic City Air Port on Albany Avenue, Atlantic City. This will be the first demonstration of the construction and paint-

will be the first demonstration of the construction and painting of aircraft to look like limit will be a painting of aircraft to look like limit as a reproduction of the project and the Cautilever Company may have a reproduction of several birds, one being the sea gull and the swallow, but the "Arrow" and the "Bullet" will predominate. Captain Ugo d'Annunzio, the son of the poet-aviator, has built a sunning aerial runabout, which is to be named "The Hummingbird.

There will also be exhibited models of all the types of aeroplanes and seaplanes used by the Allies in winning the war

planes and seplaines used by the Allies in winning the war in the sir. Each model is made on scale and bears the in-lies of the state of the state of the state of the state Eighten special film, of actionattic events taken overseas and in the United States, illustrating every phase of acro-nautics, will be shown. These include French and American official films of military and naval acronautic activities.

Among the scientific exhibits will be the exhibits of new scientific instruments for aerial navigation. The announcement and description of these is held as a surprise. Two of the instruments to be exhibited were built especially to solve the most difficult problem of aerial navigation in con-

nection with trans-Atlantic and trans-l'acific flying. nection with irans-ranante and trans-l'acific flying.

A most magnificent exhibit will be the photographic exhibit, showing every type of aircraft of every nation and aerial views of clies and places in every part of the world.

This last exhibit is entitled "Around the World by Air" and shows aerial views of all the capitals of the world, the most

shows aerial views of all the capitals of the world, the most important cities of the world and such far-off places and historic landmarks as the Tower of Babel, the Dyramski, the views all photographical recently from the air.

The complete set of French Aerial Wafare passings of Licuit. The complete set of French Aerial Wafare passings of Licuit. The complete set of French Aerial Wafare passings of Licuit. The complete set of French Aerial Wafare passings of Licuit. The complete set of French Aerial Wafare passings of Licuit. The complete set of the set of More Lathery and Leavil, Cal. William Than.

The Later Charles of Aerial even design with Aerial's participation of Aerial even design with Aerial's participation. The Aeria Charles L. The Aeria Charles of Aerial even design with Aerial's participation of the William Than Charles L. The Aeria Charles of Aeria even set subhing the mangineral International Russian (U.S. N.).

The Aeria Charles of Aeria even schilding the mangineral International Topoly, and the Michelin Trophy. All together there will be ten trophes eathbrid expressing the derenation at the extension of the propose calabrate expression of execution at the proposed the proposed the extension of the proposed the proposed the extension of the proposed the

First Aeronautica Convention to Discuss Every Aspect of Aeronautica The Convention which is to be held on the magnificent Steel Pier is to be the first convention where every aspect of aeronautics has been discussed. The program, which is most thorough and extensive, is as follows: Aero Parade in Aeronautic Exhibit

Panorama of Air Service Section of Liberty Loan Parade of May 3d, planned to date: t. Three men dressed as aviators marching abreast, center man carrying the American flag, both end men carrying banner rending, "Help at the ten State American Court and the Court of the

4. Moore float containing stripped acceptaine fusaclage showing interior contracting.

Secretary, 1997.

Secretary, 1997

with famous overseas pilot accompanying it seems that the famous overseas pilot accompanying it seems for the famous overs

10. Float of aerial bombs and machine guns, four kinds of each. 11. Float carrying Ruggles "Orientor," showing it in taking actual test. Man with signs will show what student is doing, when learning acrohates, such as loop the loop, tail spin, etc.

12. Float containing hospital plane, used to carry disabled men to hospital.

13. Float containing portable field machine repair shop, showing lathe, forge, etc., in actual operation. 14. Float with portable field lighting apparatus, showing dynamo, searchlights, etc., for night landings.

searchights, etc., for night landings,

15. Float containing fully assembled Spad hiplane with famous over-seas ace, accompanying it (probably Capt. Rekembacker). Sign will became America's premier Ace." (Indefinite: Small boy on anner float shooting small paper aeroplanes into crowd with Victory Loan printed on their wings.

16. Track with cable dram, towing observation balloon sausage, 90 set long, with trailer following. 17. Six touring cars of men dressed as sviators.

18. Indefinite—Float showing cadets at their ground school, training, towing them assembling machine gun and working on wing. showing them assembling maximine gun and working on wing. Flying above paradle will be an acrobate team doing stunts, a formation of five to seven planes, a large Handley Page following, and a large dirighth balloon. A balloon company will also have a halloon in Van Courtland Park, showing me leaping in parachutes, if weather permits (April 26 to May 3).



A view up the Beardwalk at Atlantic City, with the Traymere in the foreground, as it will appear to the aerial visitors at the Pan-American

TROPHIES AND PRIZES TO BE COMPETED FOR AT ATLANTIC CITY IN MAY

HE following Trophies and Prizes have been offered for competition at Atlantic City, and from other points to Atlantic City from May 1st to May 31st. All contests are open to Army, Navy, Aerial Mail and Civilian aviators.

\$6,000 Curtiss Marine Flying Trophy. Mr. Glenn H. Curtiss has offered a prize of \$1,000 to go to the first entrant for the Curtiss Marine Flying Trophy who covers the distance of 1,000 miles without stopping. The contest for this prize will open on May 1st, and con-tinue until it has been accomplished.

The entrants who wish to compete for this prize during the Convention can fly over the 60-mile course be-tween the Steel Pier and Cape May Air Station. This magnificent trophy is exhibited at the Art Salon on the Steel Pier.

The entrant's record will be counted as a flight for the Curtiss Marine Flying Trophy under the rules for the 1919 competition for this trophy.

(2) The \$5,000 Pulitzer Trophy, offered for annual competition, to be awarded his year to the awarder who perform anywhere to Atlantic City, and from Alantic City and from Alantic City to anywhere during the mouth of May. Competitors for this trophy will start from or end at the Atlantic City Air Port, on Albany Arenue, Atlantic City, which affords unsurpassed facilities for

both land and water aeroplanes.

The Boston Globe Trophy and \$1,750 cash prizes to be awarded as follows: \$1,000 and the trophy to the

aviator who makes the best record in flying from Atduring the month of May; \$500 and \$250 to the aviators who make the second and third best records, respectively

Start or ending will be on the Atlantic City Air Port.

(4) The Cleveland Plain Dealer Trophy and \$1,750 cash prizes to be awarded as follows: \$1,000 and the trophy to the aviator who makes the best record flying from Atlantic City to Cleveland, or from Cleveland to Atlantic City during the month of May; \$500 and \$250 to the aviators who make the best records, respectively. Start or ending will be on the Atlantic City Air Port.

(5) The Detroit News Trophy and \$1,750 cash prizes to be awarded as follows: \$1,000 and the trophy to the aviator who makes the best record flying from Atlantic City to Detroit, or vice versa, during the month of May; \$500 and \$250 to the aviators who make the best records, respectively.

Start or ending will be on Atlantic City Air Port.

(6) The Atlanta Journal \$1,750 prizes, to be awarded to the three aviators who make the best record flying from Atlantic City to Atlanta, Georgia, carrying the Journal, Start or ending will be on Atlantic City Air Port.

(7) Colonel William A. Bishop's "Ace of Aces Trophy." to be awarded to the aviator who makes the best record in flying from Toronto to Atlantic City, or vice versa, during the month of May.

Start or ending will be on Atlantic City Air Port.



Looking toward the ocean at the upper end of the Boardwalk. The Marlboro-Blenheim is in the foreground

The \$3,000 New York Herald Aero Efficiency Prizes, to be awarded as follows: \$1,000 to the aviator who covers the greatest distance in a non-stop cross country flight, starting from or ending at Atlantic City between May 1st and May 30th with an aeroplane of any horse-

\$250 to each of the aviators who cover the greatest distance in a non-stop flight from or ending at Atlantic City between May 1st and May 30th with aeroplanes of:

- (a) not over 100 h.p.
 (b) not less than 100 h.p. and not over 200 h.p.
 (c) not less than 200 h.p. and not over 400 h.p.
- (d) not less than 400 h.p. and not over 600 h.p.
- (e) not less than 600 h.p. and not over 800 h.p. (f) not less than 800 h.p. and not over 1000 h.p. (g) not less than 1000 h.p., and over without limit.

Start or end of flight will be on Atlantic City Air Port.

(9) \$2,000 Intercollegiate Seaplane Speed Trophy, for annual competition, to be awarded to the college whose representative makes the best record in flying twenty times over a five-kilometer course at Atlantic City each

Saturday off the Steel Pier during the month of May. This trophy is to become the property of the college that wins it three years in succession.

(10) \$2,000 Intercollegiate Aeroplane Trophy, for annual competition, to be awarded to the college whose representative makes the best record in flying twenty times over a five-kilometer course at Atlantic City each Sat-urday during the month of May. To be held at the Atlantic City Air Port.

This trophty is to become the property of the college that wins it three years in succession.

(11) \$2,750 Cash Prizes for Intercollegiate Weekly Seaplane Races offered under the terms of the will of Mr. Samuel H. Valentine. These "Expense Money" prizes are to be awarded in connection with the races for the Intercollegiate Seaplane Trophy described above. are offered to assist the collegiate aero clubs and individuals making the entries to defray the expenses con-nected with entering a team. Competing for same will not, therefore, endanger the amateur status of the competitor.

There will be four prizes awarded each Saturday for the best speed made in competition for the annual Inter-collegiate Seaplane Trophy as follows:

First prize							٠		,					\$250
Second prize														150
Second prize Third Prize														100
Fourth Prize														50

Colleges are permitted to appoint new entries and enter different machines for each race. The name of the entrant and type of machine need not be announced until half hour before the race.

(12) \$2,750 Cash Prizes for Intercollegiate Weekly Aeroplane Races, offered under the terms of the will of Mr. Samuel H. Valentine, are to be awarded in connection Samuel 11. Valentine, are to be awarded in connection with the weekly races for the Intercollegiate Aeroplane Trophy described above. They are offered to assist the collegiate aero clubs and individuals making the entries to defray the expenses connected with entering a team. Competition for same will not endanger the amateur status of the competitors.

There will, therefore, be four prizes awarded each Saturday for the lest speed made in competition for the Annual Intercollegiate Aeroplane Trophy, as follows:

First F	rize .	 													\$250	
Second	Prize								ì						150	
Third	Prize	 												 	100	
Fourth	Prize						٠,								50	
C-11		 	٠.													

enter different machines for each race. The name of the entrant and the type of the machine need not be an-nounced until half an hour before the race.

- (13) The Intercollegiate Dirigible Trophy. This may not be held until later in the season,
- (14) The Intercollegiate Balloon Trophy.
 This may not be held until later in the season.

All of these contests, except the intercollegiate, are open to Army, Navy, Marine Corps, intercollegiate and civilian aviators. The rules are similar, so that a competitor can compete for more than one trophy in one flight.

The intercollegiate contests are open to both gradnates and undergraduates

(15) Open Seaplane Speed Contests (with handicap) for twelve laps of five miles each. To be held on Decora-tion Day. Prizes to be awarded under the terms of the will of Samuel H. Valentine. First Prize\$1,000

 Second Prize
 500

 Third Prize
 250

(16) Aerial Commuting Prizes.

1. To be awarded to entrants who cover the greatest total distance in commuting by air from anywhere to Atlantic City during the period of the Convention,

(Distance to be measured in straight line.)

2. To be awarded to entrants who make the greatest number of trips in commuting by air from anywhere to Atlantic City during the period of the Convention.

Second Prize Silver Medal Third Prize Bronze Medal

3. To be awarded to entrants who make the longest flight in commuting from anywhere to Atlantic City during the period of the Convention. (Distance to be measured in straight line.)

First Prize Gold Medal Second Prize Silver Medal Third Prize Bronze Medal

- (17) \$1,000 Opening Day Prize, offered under the terms of the will of Samuel 11. Valentine for land aeroplanes the will of Samuel II. Valentine for land aeroplanes and scaplanes. To be awarded to the aviators making the best records in competing for any of the trophies and prizes on May 1st, flying from Atlantic City to anywhere, and from anywhere to Atlantic City. Competitors starting from Atlantic City will start from the Municipal Air Port at Albany Avenue, Atlantic City. Competitors from other points will end their flights at the Air Port. (18) \$1,000 Aerial Runabout Races, offered under the will
 - of Mr. Samuel H. Valentine for speed competition between one-seater aeroplanes of not over 75 h.p. races are to be held as follows:

First race, Saturday, May 10th, at the Atlantic City Air Port, Albany Avenue, Atlantic City

	Second Third P	Priz rize	e						:	:							:						:		150	
	Fourth	t'rize							,				٠				*	٠				٠	٠		50	
A	Second radir Port:	e, S	a	tu	r	d	a	y	,	3	ı	a	,	1	7	ti	t,	ì	ıt	tŀ	16	A	t	la	ntic	City

Second Prize Third Prize

These races are to be held at the Atlantic City Municipal Air Port.

(19) The Akron Trophy, presented by Major Thomas S. Baldwin, to be presented to the pilot who makes the best time with any type of aircraft in flying from Akron to Atlantic City, or Atlantic City to Akron, during the month of May.

Start or lauding must be made on the Atlantic City Air Port.

- (20) \$100 West Point Merchants' Association Prize, to competitor of Pulitzer Trophy who starts from or ends at West Point, Mississippi.
- (21) Atlantic City Aero Club \$25,000 Trans-Atlantic Prize. The Atlantic City Aero Club is offering a cash prize of \$25,000 to be awarded to the pilot of the first air-craft to fly over the Atlantic, which starts from or terminates at Atlantic City during the mouth of May. Entry blanks giving the conditions can be obtained from the Secretary of the Aero Club of America, 297 Madi-son Avenue, New York, or from President Albert T.

Bell, of the Aero Club of Atlantic City, Atlantic City, New Jersey.

Start or landing must be made on the Atlantic City Municipal Air Port

Other prizes offered since date of writing will be announced at Atlantic City at the opening of the Convention and Exposition.

Stops and repairs are permitted during the cross-country

races, but the pilots will be penalized five per cent, of the total distance they cover for every stop under one hour, and ten The aviators may make as many attempts as they wish for the Trophies and Prizes. The distance covered in each case will be measured in straight line flight from the point of de-

parture to the point of landing.

Flights made for any of the above mentioned Trophies and

Prizes will count for the Pulitzer Trophy.

DAILY PROGRAM FOR PAN-AMERICAN AERONAUTIC CONVENTION. EXHIBITION AND CONTESTS

THURSDAY, MAY 1ST

Opening of Convention and Exhibit,

AFTERNOON-Reception at Aeronautic Hall on the Steel Pier. Addresses by United States Government, State and aeronautic authorities.

EVFNING-Aero Show and addresses by officials.

FRIDAY, MAY 2ND
AFTERNOON-Aero Show. Preliminary tests of aircraft.
EVENING-Moving pictures and address on Flying For Sport and
Pleasure

ATURDAY, MAY 3RD

AFTERNOON-Aerial contests.

JUNDAY, MAY 4TH

ORNING-Memorial service by eminest Divine for the dead airmon,

BORNING-Memorial service by eminest Divine for the dead airmon,

of the air and their parents and amountement of the sawd of

the Aero (Jub of America, Medai of Valor, and the Aerial League

of America, Diploma of Honor.

MONDAY, MAY 5TH
AFTERNOON-First parachute contest for \$500 Bennett Prize.
EVENING. "The Large Dirigible and Its Value for Transportation."
Representatives of railroads, express, steamship and other transportation organizations in wited to attend.

TUESDAY' MAY 6TH
AFTERNOON-Illinstrated addresses on "Aerial Forest Patrol."
Forestry Department of every State invited.
EVENING-"Work of Aerial Police Squadrons, and Why Every City
Should Have One."

WEDNESDAY, MAY 7TH
AFTERNOON-Acrial Mail they
lines, Charman of Pest Office and
Fort Roads Committees of Busses of Representatives and Sensitive
Post Roads Committees of Busses of Representatives and Sensit,
and Sensitive Sensitives of Sensitives and Sensitives
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of Sensitives of Sensitives of Commerce of
Vision Class sensitive to attend (to be held in Convention Hall)

Vision Class sensitive to a track of the Sensitives of Commerce of
Vision Class sensitives of Sensitives of Commerce of Sensitives
and the Part to be Played by Aircraft in City Planning." Chambers of Commerce and City Planming." Chambers of Commerce and City PlanMercing of Pederation of Women's Clabs to be held in Convention Hall.

FRIDAY, MAY 9TH
AFTERNOON-Tests of Aircraft for Saturday's Races. Second parachute competition for the \$500 Bennett Prize.
EVENING-Illustrated addresses on "Latest Developments in Aerial
Warfare and Advenues in Aerial Warfare," told by famous

SATURDAY, MAY 10TH
AFTERNOON-Army, Navy and Marine Corps Day. Aerial contests
and tournament.
EVENING-United States Army and Navy Officers' Reception. Reecption and addresses at Aeronautic Exhibition Hall of the Steel

SURDAY, MAY 11TH AFTERMOON AND EVENING.—Presentation of the flags by different AFTERMOON AND EVENING.—Presentation of the flags by different the State, Each State will present a flag to each Aero Squaddon, the members of which were overwhelmingly natives of that State and the Aero Club and Aerial League Franch of that State, and the Aero Club and Aerial League Franch of that State, All States and cities are invited to send delegates, and the Army, May and Marine Corps to send representatives.

MONDAY, MAY 12TH and illustrates of the secondary of the ATTERNOON—Demonstration and illustrates on the ATTERNOON—Demonstration by Day and by Night. "All maional affortisting agents by Day and by Night." All maional affortisting agents invited to attend. EVENING—Pan American Aerial Topogot Over Latend. EVENING—Pan American Aerial Topogot Over Latendary Daylor.

TUESDAY, MAY 13TH
AFTERNOON AND EVENING—"Pan-American Aerial Transport
Over Water." Addresses by members of the 20 Latin-American
Republics' Commissions.

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH AFTERNOONS AND EVENINGS—"The Airways and Aerial Transport in Europe, Canada, Africa, Australia and Asia."

FRIDAY, MAY 16TH
AFTERNOON AND EVENING—"Aerial Navigation Instruments for
Flying Over Land and Water." Aviators, navigators, scientific
instrument makers and aeronautic experts invited.

AFTERNOON-Acrial races and contests. Illustrated addresses on Acrial Photography.

EVENING-Ball.

SUNDAY, MAY 18TH
AFTERNOON AND EVENING-Illustrated addresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic

MONDAY, MAY 19TH
AFTERNOON-Addresses on "Need of Broader Attitude Regarding
Movintors."
EVENING—Histrated address on "Hos Army Medical Standards
and Inspection Leasen Accidents." Insurance companies and
ageotts invited.

TUESDAY, MAY 20TH
AFTERNOON AND EVENING—lilustrated addresses showing different ways of crossing Atlantic by air and the problems to be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST
AFTERNOON-Aero Safety Day. Discussion of aero safety provisions
made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in figing.
EVENING—"Progress Made in the Art of Piloting Aeroplanes." Illus-

THURSDAY, MAY 22ND
ATTERNON AND EVENING-Addresses and discussion, of meteorACTERNON AND EVENING-Addresses and discussion, of meteorology—'Ilso the Weather Forecasts Can Be Extended and Make
More Edinicist by the Use ol Astrach in Exploring the Upper
Adv., also 'Ilso whe Weather Forecasts Help Acrial Naviga,
Acromatics, Propagapher and Climater Festers in Keistion to

FRIDAY, MAY 23RD
AFTERNOON AND EVENING—Addresses on "Aerial Jurisprudence—Aerial Laws and Regulations of Air Traffic." (First day).
Lawyers, traffic commissioners and police authorities of different countries invited

SATURDAY, MAY 24TH
AFTERNOON-Races sod contests.
EVENING-Illustrated address on "Need of Establishing Altitude
Levels for Interostomal, Interstate and Interurban Air Travel."

SUNDAY, MAY 25TH EVENING-Aeronautic Art Day. Address on "Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paint-ings," by Lient. Forre, Lieut. Ruttan and others. All prominent artists, managers of art galleries and art patrons savited to

ENGINEERING WEEK

MONDAY, MAY 26TH EVENING -- Aeronautic Engineeriog Problems and Their Prospective Solution. Opening of contests for designs and ideas for large Solution." aeroplanes.

TUESDAY, MAY 27TH

EVENING—"Factors That Increase the Efficiency for Large Dirigibles." "Advantages of Veneer and Plywood for Aircraft Construction."

WEDNESDAY, MAY 28TH
AFTERNOON-Address on "Problems of Flying at 35,000 Feet and
Over, and Their Prospective Solution."
EVENING—"Present Day Aero Engines."

THURSDAY, MAY 29TH
AFTERNOON-Flying Boats Versus Hydroaeroplanes for Sport and Transportation."

EVENING—Cortest for designs and ideas for large aeroplanes.

FRIDAY, MAY 30TH (Memorial Day)
AFTERNOON-Aircraft contests.
EVENING-Reception at the Aeronautic Hall, Steel Pier.

SATURDAY, MAY 31ST
AFTERNOON-Aircrait contests.
EVENING—"International Medical Standards for Aviators in War
and Peace." Reports Irom different countries illustrated with
attractive films. 5,000 medical men lovited.

SUNDAY, JUNE 1ST AFTERNOON AND EVENING-Award of prizes and diplomas for all



THE NEWS OF THE WEEK



Navy Flying Boat of F-5 Type Flies 1,250 Miles in 20 Hours

Norfolk, Va., April 26.- Four musal axiaors, in a supplane of the F5 type. Serial No. 3589, made a new world's record for an endurance flight when they flew, officially, 1,250 miles in twenty hours and ten minutes. The record was made during a continuous flight from 11.42. A, April 20. M., April 20. mill 752. A. M. April 20. mill 752. M. April 20. mil

Those in the machine were Lieuteuant Commander II. B. Grow, Ensign Delos Thomas, Ensign R. F. Souther and Ensign Irvine. The men took turns at piloting the machine, but Commander Grow was at the wheel most of the time.

The men in the machine are three meals during the flight. These consisted of coffee and sandwiches, with a plentiful supply of water. Coffee was carried in vacuum bottles, but they did not retain the heat as well in the air as they do or the ground, according to reports from the

air station.

When the machine left the naval base it carried 850 gallons of gasoline. When it landed there was scarcely two gallons in its tanks.

The F-S is an improved type of flying boat that the Navy Department intended using in patrol duty for war purposes. It is much different from the ordinary fliest patrol. It has a wing spread of 10.5 feet, is much faired that the different from the ordinary fliest patrol. It has a wing spread of 10.5 feet, is much faster than the old type, and has larger gastoline tanks. The machine was built by Curriss, and is known as a "kite local." It is equipped with twin was the control of the

While the official records claim only 1,250 miles covered by the machine, naval officers say this does not include the distance it traveled during the first few hours it was in the air, when most of the



Sidney Chaplin has established comme

flying was over Hampton Roads and Norfolk. It was stated by one officer that the actual distance covered was considerably more than given in the official figures. Only exhaustion of the fuel supply forced the ship to land, as the motors were functioning perfectly.

National Advisory Committee for Aeronautics to Report on Civil Aerial Transport

Washington, D. C.—A report on civil acrial transport is soon to be issued by the National Advisory Committee for Aeronautics. The report will embody specific recommendations looking toward the development of commercial flying.

Passenger Carrying Service Established in Kansas City

Kansas City, Mo., April 21.—The Central Aircraft Corporation announced inanguration of a passenger-carrying service aeroplane.

Rates for passengers were quoted at \$10 and up for any distance within 150 miles of the city, dependent on weather condi-

Lient. James H. Smith, former instructor at Richfield, Tex., will pilot a Curtiss two-passenger machine as a starter for the company.

Sidney Chaplin Announces Commercial Air Lines for Pacific Coast

Los Angeles, Cal.—Considerable interests are also been aroused here because of the amountement, this week, by Sidney Chaplin, brother of the world-iamous Charlie, of a commercial transportation air line which will hink the principal cities of the Pacific coast together in close communi-

The Chaplin Company will undertake to operate a passenger carrying service, using both hydro-acceptance and extended to the control of the co

Planes carrying five and ten passengers will be operated between the two points, the first flight being scheduled for June 1st. The distance between Catalina and the mainland is twenty-six miles.

The principal cities of the Pacific coast will also be included in the Chaplin plan, depots to be established at Pasadena, Hollywood, Long Beach, San Diego, Coronado Beach, Del Monte and San Fran-

Although not generally known, Sidney Chaplin has been interested in aviation since the early days and was on the inside of the game in the days of Bleriot, Farman, Fournier and Paulhan.



The Martinsyde "Raymer" in which Captain W. Morgan will ottemp! the trans-Atlantic flight from St. John's, N. F., as soon as favo weather prevails

Business Men to Use New York-Atlantic City Airline

From present indications, the passenger carrying service to start on May first be-tween New York and Atlantic City will be extensively used by business men during the Pau-American Acronautic Convention, which starts on that date. Mr. has booked a passage,

Flying Boat Makes Duration of 9 Hours

What is believed to be the best duration What is believed to be the best duration record for a flying boat carrying a full load and five men was made by Ensign M. J. Dwyer, U. S. N. R. F., and four others in the crew. The flight was made at Queenstown, U. S. N. Air Station, Ireland, November 9, 1918, two days before the armistice was signed, and details of the record have not before been given out to the general public

to the general public. The flying boat was a twin Liberty-motored Curtiss H-16 (No. 1048). The crew was composed of First Pilot Ensign M. J. Dwyer, Second Pilot Ensign G. L. Compo, Observer Ensign Tolin, Second-Class Radio Electrician Walcott, and Eustralia Ensign Composition of the Composition of

Class Ratio Electrician Valcott, and En-gineer Shea, C. M. M.
Three hundred and thirty gallons of fuel were carried, of which 315 gallons were consumed. Thirty gallons of oil were consumed. Water temperature 152°, Revolutions of the engines, starboard, 1200 R.P.M., port, 1100 R.P.M. "Maribe" propellers used. Oil temperature: star-board, 27; port, 22.

poset. 27, port. 22.

The weight carried was made up of 16 bounds extra fuel in case of a forred landing at eas; two 240-pound R.F.C. throughout the flight), a radio set weighing 150 pounds; machine gun mounts, etc. Model H-16 Phying Boat has the follow-plane, 59 or 5; span, lower plane, 58 or 17; total supporting surface, 164 sq. it; overall length, 26 or 17; total supporting surface, 164 sq. it; engines, 4313 lbs.; power plant, 2622 lbs.; ited weight, 10,172 lbs. The loading is calculated

= 8.74 lbs. per sq. ft. calculated -1164.33

Load lifted per horsepower -

The machine ascended at 7.29 in the morning and landed at 5.06 P. M., a total duration of 9 hours and 37 minutes. Average air speed, 80 knots.

On the preceding day the same machine and crew, with the addition of one more apprentice radio operator, remained in the air continuously for seven hours and ten

arr commonsty for seven hours and committees.

These flights were witnessed by Commander J. C. Townsend, U. S. N. commandant of U. S. N. Air Base, Queenstown, Ireland, and Commander F. R. McCrary, U. S. N., Naval Aviator, commander of U. S. N. Air Stations in Ireland,

Ensign Dwyer is at present stationed at Experimental Squadron, U. S. N. Air Station, Hampton Roads, Virginia.

The Transatlantic Flight

While the aviators at St. Johns, New-foundland, are being delayed day by day by adverse weather conditions, the Navy flying boats are being rapidly put into

shape for the transatlantic flight. The NC-1, the NC-3 and the NC-4 are now practically prepared to start on the



The Martinayde "Raymer," powered by a 285 H.P. Rolls Royce motor, being assembled at St. John's, N. F. This plane has completed its final tests

first lap of the flight, from Rockaway Beach, L. I., to St Johns, N. F. A test of the NC-3 on April 23 proved that the ship could not rise from the water with but three of her four motors

in operation. It was hoped that this feat could be accomplished, as it would per-mit of a great range of endurance. On another test, with four motors, she car-ried ten passengers and a load of 29,500 pounds in a two-hour flight.

The route which naval officers are said to have decided upon is by way of the Isles is not considered possible with the NC type of flying boat equipped with four motors, owing to the amount of fuel required for these motors.

The cruiser Baltimore, with mechanics and sailors from the Rockaway Naval Sta-tion who have handled NC flying boats, sailed on April 25 for Halifax. It is un-derstood she will land the crew from Rockaway at Broyle Harbor, Newfoundland, which will be the jumping off place for the transatlantic flight.

Other destroyers are ready to get under way at once in order to patrol the selected

route. A cable message from the British Air Ministry, asking reasons for the failure of Harry G. Hawker, Australian aviator, and Capt. Frederick P. Rayuham, his British rival, to start their transatlantic

flights was received at St. Johns on April 23. Unfavorable conditions, however, persist, and present prospects do not point to an early start. Hawker and Raynham are therefore marking time, impatiently waiting for a change in the situation.

Meanwhile, more rivals are getting their planes into shape. The four-motored Handley Page hiplane is en route to St. Johns on the Furness liner, Dighy. She is expected to stop at Harbor Grace, where the Handley Page hangar has been

completed With the plane is Major Trygne Gran, a With the plane is Major Trygue Gran, a Dane, who was the first man to fly across the North Sea, receiving the Military Tross as a reward for that exploit in Angust, 1914. Major Gran is assistant pilot and navigator.

The pilot, also on the Digby, is Major Brackley. The observer is Rear Admiral Mark Kerr and the fourth man of the crew is a wireless operator whose name is not announced.

A dispatch from Berlin states that Baron Gemingen, nephew and successor of Count Zeppelin, intends to attempt to of Count Zeppelin, intends to attempt to cross the Atlantic in the Zeppelin dirigi-ble known as the Z-72. The armistice conditions prevent the completion of the airship, on which about two weeks work s required.

The cruiser is 715 feet long with a diameter of more than sixty feet. She



Front and side view of the Fairey III.C biplane equipped with a 360 H.P. Rolls Royce mote This plane is very similar to the Feirey plane, which will soon ettempt to fly across ti Attentic

will have seven motors of 240 horsepower each. Her gas capacity will approximate 2,000,000 cubic feet. Baron Gemingen es-timates that the distance from Friedrichshaven to Washington can be covered in sixty-eight hours, depending upon the weather. It is asserted in Zeppelin circles that under favorable conditions the new airship could make the round trip without

Aero Club of Syracuse Formed

Syracuse, N. Y.—Several prominent business men of Syracuse have organized an aero club here. Pressure will be brought to bear to secure a municipal landing field, and several of the members propose to purchase aeroplanes. Affilia-ttion with the Aero Chib of America is to be arranged.

Curtiss Aeroplane Makes Delivery De-spite Harbor Strike

spite Harbor Strike
Newark, N. J.—The first consignment
of merchandise transported by air from
New York to Newark was received in
that place on April 19. It was brought in
a 100 horsepower Curtiss biplane, by Joseph Bennet, an aviator employed by the Curtiss Company, and consisted of a shipment of women's wearing apparel weigh-

ing 175 pounds.

The clothing was "shipped" by Bamberger & Co., of Newark, and it was explained that this method of transportation had been decided upon to escape the delay that would be caused in the event that New York harbor were tied up by the threatened strike

The International Aeronautical Com-mission Draws Up Regulations

The work of the International Aeronautical Commission, appointed by the Peace Conference to formulate regulations for the operation of aircraft, has practically completed its work. A tentative draft of the regulations has been issued, which is awaiting the approval of the Peace Conference

Provision is made for the licensing of aircraft under the nationality to which they belong. Tests for the licensing of pilots are prescribed in detail; these in-clude not only flying tests, but examinations to determine the applicant's know-ledge of the theory of aeronautics and

of aeroplanes.

All aeroplanes must carry a route book, containing information as to the nature of containing information as to the nature of the airship, its registry number, and own-ership; for each journey, name, national-ity and residence of the pilot, the place, date, time of departure and landings,

date, time of departure and landings, route covered, and incidents of trip. Each nation is given the right to pro-hibit flying of planes of all nationalities over prescribed areas. Planes are not perand ammunition without special permission. Military planes are not to fly over

foreign countries.

the pilot.

The registry number, to be painted on the under side of the lower wing, the upper side of the upper wing and on both sides of the helm, or on each side, in the case of aeroplanes, on the top part of the balloon under the car and on both vertical sides of the car, in the case of dirigibles and balloons, is to be assigned, as follows: First, capital letters to indicate owner's

nationality, as follows:

Belgium, B; United States, US; France, F; Great Britain, GB; Italy, I; Portugal, P; Rumania, R; Serlia, SB. Second, small letters, characteristic of the nature of the airship: A, for aeroplanes; B, for free balloons; D, for

dirigibles.
Third figures and numbers to indicate

the identity of the craft.

The registry numbers are to be circulated for the use of all nations. A certificate of competence is required for all members of the crew, as well as

Specific regulations for the arrangement and number of lights on all types of aircraft have been drawn up. For free balloons and dirigibles not under power, regulations are provided for indicating that they are at anchor, and cannot ma-

Whistle signals are provided as follows: In fog, rain or snow: 3 short blasts at intervals of 3 seconds.

Over landing point: Alternate blasts of and 9 seconds duration at intervals of seconds.

In case of distress: Blasts of 9 seconds duration at intervals of 3 seconds.

It is considered that the regulations drawn up will be accepted without amend-



Chief Instructor Billy Parker, Harry Colburn, Bernard T. Daly, Peter Inglebritson, Elizabeth Modeer, and Fidel Vela of the Dewey Aviation School

aerodynamics, of motors and instruments, One Hour Flight from Springfield to

Boston, Mass., April 26. — Lieut. Brownie Dallas today won the Hamilton-Coolidge cup offered by the New England coonage cup offered by the New England Liberty Loan Committee for the aeroplane race from Springfield to this city. The flight occupied approximately one hour. Three of the four planes which started were forced by weather conditions to land in Worcester.

and in Worcester.

Lieut. Dallas reported that he came
through areas of snow and rain, but had
fair weather after passing Worcester.
He was accompanied by Sergeant J. St. Croix, who acted as mechanician

Aeroplanes and the Liberty Loan

An important phase of Liberty Loan demonstrations throughout the country is acronautics. In New York, for instance, daily flights of all types of planes have been arranged. "Victory Way," the chief center for loan speeches and campaigning, is equipped with radio receiving apparatus and amplifiers, so that conversations tus and ampiners, so that conversations on planes in flight are made audible through a large number of loud speaking megaphones. By this means, crowds have heard conversations between pilots flying at different altitudes over the city, as well as phonograph music played aboard dirigibles and submarines.

The work of the air circuses performing over various cities has won the encomium of the loan organizations.

Captain White, Chicago-New York Rec-ord Holder, Flies from New York to Washington in Good Time

Capt. E. F. White, U. S. Army, who made the record-breaking non-stop flight from Chicago to New York on April 19th, flew from New York to Washington in one hour and fifty minutes on April 21st. at 11:30 a. m., and landed at Bolling Field, at 11:30 a. m., and landed at Bolling Field, Washington, at 1:20 p. m. With him went H. M. Shafer, the civilian mechanic, who accompanied him on the Chicago to New York flight.

Book Reviews

KEEPING FIT ALL THE WAY. Compiled by Walter Camp.

Walter Camp.

The author preaches the gospel of health, strength, efficiency and happiness to men. He points out the danger to health and the economic loss consequent upon a man allowing himself to get out of good physical condition and he tells him how he may recover his impaired vitality and begin again to enjoy life—yes—and to do big things in life. The exercises given in this volume are founded upon those used by every man (or woman) between the ages of fifteen and sixty, or even be-yond. This book is illustrated by many yond. This book is instracted by many photographs explanatory of the exercises recommended. The U. S. Air Service is thinking seriously of adopting Walter Camp's method in keeping our Army and Naval aviators in trim.

Copies can be purchased at The Aero-nautic Library, Inc., 299 Madison Avenue, New York City, at the price of \$1.50 post paid.

Motion Picture Film Distribution by Aeroplane

New York, N. Y.—According to an airman recently returned from overseas, an enterprising motion picture corporaan enterprising motion picture corpora-tion has engaged the services of Lieut. Georges L. Vezine, late of the Royal Air Force, to deliver films to the twenty-three film distributing points operated by the company. A Curtisa seroplane is to be used. In emergency cases, officials of the company will be transported by this means.



TRADE DEVIEW



Salvage Section to Sell 1,000 Liberty Motors

The War Department authorizes publication of the following statement from the office of the Director of Sales:

The Sales and Salvage Section of the Army Air Service will shortly place on sale approximately 1,000 Liberty motors. The motors are 12-cylinder Vee type, 5inch bore, 7-inch stroke, of 400 11.P. at 1700 revolutions per minute. They are equipped with a Delco generator, lattery type gnition, 2 complete distributing units working independently, and with Zenith Duplex carburetors of the Special Liberty

All motors are new and represent a surplus over and above the anticipated requirements of the Air Service. Additional technical data and instructions to bidders may be obtained from the Sales and Salvage Section of the Army Air Service, Building "D," 6th and Missouri Avenue, Washington, D. C.

SKF and Hess-Bright Companies Combine New York—The SKF Administrative

New York—The SR! Administrative Co, which was tormed in May, 1912, to consolidate the interests of the SR! Mail to Co, has been merged with the Atlas Steel Ball Co, into a new company to be known as SKF Industries, Inc. The Atlas Company has for some time been controlled by the SKF Company.

The immediate purpose of the merger, which brings together the sales and exceutive departments of the three companies, is to facilitate the carrying on of important research work. For this purpose ground is being broken adjacent to the Hess-Bright plant in Philadelphia.

Major Halford in America in Interest of English Patents

New York—Major F. B. Halford, representing Engine Patents, Ltd., of Final and, which developed the Ricardo cross-head piston type engine used in the British tanks, and also the slipper design of piston, arrived in New York recently in the interest of American patents on the assemble development of the property of the



Dr. Brewster, First Physician to Use Aero Transport, Enthusiastic

Beaver City, Neb.—Dr. Frank A. Brewster, the first physician to employ an aeroplane for making professional calls, is enthusiastic regarding the future of artial transport.

acrial transport.

Beaver Giy, Neh, is a town of less than a thousand inhabitants. It boasts of one railroad. During the summer the dirt roads are excellent, but in the spring, only the old-fashioned horse and buggy can travel them. An automobile is useful for

a iew mouths during the year.

Dr. Birewster, one of the hest-known
physicians in southern Nebraska, is
obliged to do a great deal of traveling,
for his calls take him to Hendles, Wilsonville. Stamford. Oxford. Edison,
Arapahoe, Holbrook and Cambridge in
Furna's county, and also to the farger
cities in neighboring countries—McCook,
Stockville, Etwood, Alma and Holdredge.

When Lieut. Stevens returned from the service he was so optimistic over the future of air travel that he persuaded Dr. Brewster to purchase a Curtiss JN 4D-2 plane for the Curtis Courts.

Status of War Department Aircraft Contracts

Washington, D. C.—An official statement recently issued reports that 74 per cent, of the Bureau of Aircraft Productions's contracts have been cancelled, 25 per cent, delivered, and 1 per cent, remaining of those in force on November 9,

Production and Delivery of Aircraft Guns

Washington, D. C.—At the date of the signing of the armistice there were \$4,436 Browning guns on order. Ninety-eight per cent, of the contracts were cancelled. The remaining 2 per cent, 1,030, have been delivered.

31,900 Lewis guns were on order on November 11. Seventy-five per cent. of the contracts were cancelled, and 8,085 guns delivered since that time, in completion of the remainder of the contracts. As to Vickers aircraft guns, 60 per cent. of the contracts, which called for 11,779 guns, were cancelled. The remainder

Bureau of Aircraft Production Withdraws Contract Cancellations

4,049 guns have been delivered.

Washington, D. C.—Dring the week unded April 12, 1919, the Bureau of Aircraft Production withdrew cancellations and suspensions of contracts to the amount of 82,040,879, thus reducing the total of cancellations and suspensions of contracts since the armsistic from \$500,790/17 to \$498,887.88. These windrawals of cancellations and suspensions are tractically all for sparse parts and accessories, trickly all for sparse parts and accessories of cancellations and suspensions of contract of cancellations.

Palsur 101
Aeroplanes and spare parts \$275,929,088 5
Aeroplanes and spare parts and chemical plants and chemical plants and chemical this runnents and accessories and supplies Falbracs, lumber, and plants lumber l

7,302,295

MAINTAINING CONSTANT PRESSURE BEFORE THE CARBURETORS OF AERO ENGINES REGARDLESS OF THE ALTITUDE

By LESLIE V. SPENCER, M.E.

Formerty Editor of Technical Publications, Experimental Department, Aeraplane Engineering Division, Bureau of Aircraft Production at the McCook Field, Dayton

((outinued from last week)

The Moss Turbo-Supercharger

I has previously been brought out that the Sherboudy and Moss turbo-superchargers have few mechanical details in common, although both designs adhere to the same enterprise of operation. This is to be experted, at the control of th

into account.

Dr. Moss, in his development work, lad back of him his Lir, Moss, in his development work, lad back of him his experience and that of the General Electric Co., Lynn, Massich his work independently. He was, however, assisted by the Fergus Motors of America, Newark, N. J., which concern did much of the accurate construction work inder his direction, and by the De Lawal Steam Turbine Co., Trenton, N. J., where prior to any operative trials on the Liberty engine. On the other hand, all Moss experimental work was carried on by General Electric, including steam testing.

Like Mr. Sherbondy, Dr. Moss was specially fitted to conduct experimental and research work on exhabit gas turbines.

Like Mr, Sherbondy, Dr. Moss was specially fitted to conduct experimental and research work on exhant gas turbines and direct-counceted air compressors through while expenses extended to experimentation for a number of years under Dr. Moss' direction along his line, but the difficult nature of the gas turbine problem is brought out forcibly by the fact that to date this concern has not been able to perfect its turbine and compressor units to the point where it cares to put them on the market as a commercial proposition. It will be apprecompressor unit, but the new part was the producing of such a unit for the highly special service which it is called upon to perform in an avaisation engine in connection with the Ratean system of supercharging.

Ratean system of supercharging.
At the illustrations show, the Aloes turbo-supercharger incorporates the turbine rotor and the centrifugal compressor
air impeller on the same shaft, and is arranged so as to leave
the Liberty engine carburetors in the center of the V, connected to the air discharge of the compressor by an induction
pipe of generous proportions which is rectangular in section.
The engine exhausts are on the outside, and it governs
sent to the mozele exhaust headers which connect at their
front ends to the flances on either side of the nozele loss.

roote mass to the order of the exhaust headers and the mozele low is evident from the illustrations. By this design the exhaust gases are offered as unrestricted a passage in as direct a path as possible to the turbine buckets, so that the discharged gase-from the engine should possess a large percentage of their outlet energy on reaching the point of expansion. This free passage feature should also have an

effect upon the cooling of the device.

Callike the Sherbondy machine, which has a circular nozale plate, with nozales all around the
turing the Moss nozales arranged in a semicircular plate set into the front side of the nozale leas,
as shown in the filter attionment of the rotor, since
the intense exchanist gas heat is not being directed to
the entire rotor all the time, but to only about one.

half of its circumference.

In finther comparison between this machine and the Sherbondy final design, it is also to be noted that due to the turnlen and compressor being practically separate so far as their housings are concerned, the Most device is of greater fore and aft width than the Sherbondon at which air circulation between the parts as possible, for cooling reasons. The construction has the disadvantage, however, that the machine cannot be installed on the Liberty engine with the propeller in its normal position. To accommodate the depth of the Moss machine there has to be a

special propeller flange and hub construction in order to laring the screw forward a small distance. In building his machine this way, it is evident that the designer considered the advantage of greater cooling sufficient to outweigh any disadvantage due to the necessity for alternating the propeller position to make room.

Instead of the air being drawn into the compressor through an opening in the front center, as with the Sherbondy, machine, the Mioss air intake is an integrally east mouth that leads from the side of the housing to the compressor center at the rear and just alread of the turbine, where the air is force in the reversed position from that of the Sherbondy impellers, the entrance side of the blades being toward the rear instead of to the Forch.

A feature of the Moss machine is the water-cooled rear hearing which shows clearly in one of the illustrations. This is nothing more or less than a special water jacket that surrounds the hearing proper, and through which water is circulated from the regular water circulation system of the engine. The machine also is provided with self-aligning bearings to take care of any slight macrinary of the position peratures encountered in operation. There is also a threat bearing to bandle the thrust created by the action of the exhaust gas on the turdine blades.

In confirmation of the precautions taken in the design and the special features incorporated against overheating the Moss apparatus has never given any appreciable overheating rouble apparatus has never given any appreciable overheating rouble are subjected to the most severe heating conditions, have shown a slight red color after considerable running, but more of the other goars has become hot enough to reach a this respect are due largely to the provision for free air circulation around the turnion and eyalally free method of exhaust. In the writer's opinion Dr. Moss has been entirely justified in change of the provision of the properties of the continuous designs of the properties of the Liberty engine, for this permits the designt of the apparatus in such a way as to get about as good cooling effect as is possible in the necessarily limited space available.

In order to prevent the nozzle box and exhaust manifolds from getting out of shape due to the temperature and the presence of the gas within, these chambers are internally braced by means of cross stays which are welded to the



Moss Supercharger Installed on Liberty Twelve



Rear of Moss Turbo-Supercharger

casings. This was found necessary due to the fact that the norzle box must not be allowed to distort to any exent, and in order to maintain a good joint between the nozzle box and the manifold on either side the manifold of must be made quite rigid without being heavy. The cross stays have proved a most satisfactor expedient.

Limitations and Future Possibilities of Supercharging

Of course, one of the first considerations in connection with the adding of any equipment or accessory to an aeroplane is whether or not the increased complication and additional weight which it entails are justified in the advantage gained, to the complication of the powerplant of the plane, increases the number of things that can get out of order, and contributes some 200 to 300 pounds to the total weight of the ship. Unless automatically controlled; at law per a subject to the contribute of the powerplant of the plane in the plane is the contribute of the powerplane of the contribute some 200 to 300 pounds to the total weight of the ship. Unless automatically controlled, it also means one the plane is the plane of the pl

Further, due to the very high operating temperatures of the devices that hase to far been designed (the temperatures range anywhere from L250 to 1,400 degrees Fahrenheit), there is an added fire risk where a supercharger is used, which is a factor of no small importance. To minimize danger from of the fuselege—wood and falieric parts—very near the supercharger. This would ordinarily mean a wider fuselage than would otherwise be necessary.

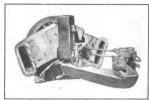
Another thing that enters into the problem is the matter of the propeller. If the screw is designed to operate efficiently assume propeller will not be able to hold the engine down to proper speeds when in the less dense atmosphere at altitudes, if there is some form of supercharging apparatus maintaining the engine's power at approximately the same value as at ground level. It would be impossible to design a fixed-pitch propeller to operate efficiently with the supercharged engine; therefore when the supercharger is developed to the point



Mass turbine wheel and water cooled rear bearing

where it is entirely practical for high altitude planes, we must also have adjustable pitch propellers so that as the height is increased the pitch of the serve can be changed to height so that a proper so that a server of the serve can be changed to the serve can be considered as the property of the server o

Acain, the supercharging system must be practically airtight on both the induction side and the exhaust side. The leakage either where the induction pipe joinst the official leakage either where the induction pipe joinst the official good of the compressor, or where the carburetor or carburetors attach to the intake pipe. At 20,000 feet, as an example, the pressure outside the induction pipe is about 7.5 pounds per square inch, whereas within the induction pipe the pressure is about twice this amount. The reason for tight joints is therefore obvious. In order to have as little pressure drop



Rear of Moss Supercharger showing nextle box and induction system

on the exhaust side between the point of engine exhaust and the point where the pressure is utilized to drive the turbine rotor, it is also apparent that there must be no leakage around the joints of the cylinder exhaust passages to the exhaust manifold, or at the juncture of the manifold to the turbine norzle box. Both of these conditions of tight joints are readily be appreciated, but by the use of special forms of gaskets and the application of red lead to the flange connections this difficulty has been largely overcome in the experimental works of ar done. In making these connections on the exhaust side, it also has to be forme in mind that due of the application of the manifolds and gas casing, for otherwise these parts would soon warp and crack. Therefore, although this plaint just executing the exhaust such was the made for expansion of the manifolds and gas casing, for otherwise these parts would soon warp and crack. Therefore, although their binstance essential, there must also be a certain degree of flexibility to the exhaust accomile. To solve the sound to the exhaust account.

Use of a turbo-supercharger—or any supercharging apparatus, for that matter—of necessity means greater gasoline consumption. This at first thought might seem to be a serious objection, in that it would mean a lesser flight range for the supercharged plane. However, when it is considered that such a plane would, due to the constant power delivery regardless of the allitude, be capable of greater speed, and hence would cover more distance in a given time than the ordinary plane, the increased fuel consumption would be more than compensated for by the greater distance covered

with each gallon of fuel.

Tests have shown that a Liberty engine on which a supercharger is installed uses anywhere from 10 to 15 per cent more fuel per horsepower-lour than does a standard Liberty engine, which on the average has a fuel consumption of about 0.504 pound per horsepower per hour.

Although the writer has no data on which to base such an opinion, it seems altogether likely that there would be some added trouble with the exhaust valves of a supercharged

First Retractable Chassis

EVERY FIRST CLASS AEROPLANE REQUIRES A RETRACTABLE CHASSIS The World's Most Efficient Light Scout MARTIN KIII First Sheek Sheek Absorbing Rudder

No other light scout of low horsepower can even approximate the performance of the K 3 for the following reasons:

- 1—The Retractable Chassis, protected by both basic and improvement patents for any shape, or method of retracting, climinates 17% of the useless or parasite resistance.
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Exclusive manufacturing rights for a similar commercial plane designed around a reliable 40 h.p. American motor for sale for 5% of the gross sales.

CAPT. JAMES V. MARTIN, U. S. Master Mariner and pioneer aeroplane builder who originated and demonstrated in 1911 the modern tractor biplane in all its essential features, such as interconnected trailing edge ailerons, tail decalage and a modern type fuselage with clamp longeron fittings.

All the Martin devices are freely at the disposal of the U. S. War Department and can be used on reasonable terms by other constructors.

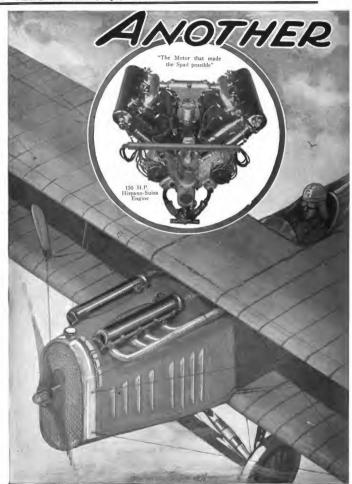
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HOME!

The boys are home!

A year and more ago they marched away and left their homes and happiness and friends behind to go to France to fight for us. They fought—they won—and now they're home again.

They've done their part, those boys of ours—they saw it through.

And we who crowd the curb and wave our hats and cheer to let them know we're glad—how about us?

We bought Liberty Bonds to put up the money to buy the guns those fellows fought with. They're proud of us.

They know we backed them to our limit while they were "over there."

But our work isn't over.

We can't let the job those boys have done in France go unfinished.

We've got to see it through.

We've got to raise the money to make sure of the Victory they've won and bring the rest of our soldiers back.

The Victory Liberty Loan is coming-Let's see it through!

FINISH THE JOB

GOVERNMENT LOAN ORGANIZATION
Second Federal Reserve District
LIBERTY LOAN COMMITTEE
120 Broadway - - - New York

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(Continued from page over)
next step is treatment with dilute hydrochloric acid (sp. gr. cartilaginous material is now washed with lime water to remove any acid. When the washing is completed the mass is boiled in water or steamed in a digester until dissolved. Any grease that forms is skimmed or filtered off. The glue liquor is then rim into shallow vats where it is clarified by the addi-tion of alum. After ten minutes boiling it is allowed to settle, before being drawn off into cooling vessels, refrigerated and dried as previously described. Frequently, for the lower-grade glues, benzine-extracted hones are directly boiled or steamed without the removal of the dirt and grease. After the glue solution is sufficiently concentrated it is strained through cloth, bleached by sulphurous acid, and evaporated at 140° F. in vacuo, or in open troughs with half-submerged steam coils.

The process used in making sinew glue is very like that for

Fish glue is made by boiling, at 230° F., fish heads, tails and lins. Since it has very weak jelling properties, it is ordinarily made into liquid glue. The offensive odor of this glue is destroyed by creosote or oil of sassafras.

Either fish or animal glues can be made into liquid glues by treatment with acctic, titric, or hydrochloric acids, a pro-cess by which their power of gelatinizing is lost. The adhesiveness of such a glue is not materially changed, and it

does not require heating.

Preparation and Use of Animal Glues: Very frequently a Preparation and Use of Animal Guest: Very trequently a high-grade glue will give very poor results, simply because it has been misused in some way. It is therefore necessary to emphasize strongly that with all glues, for the highest grade work, precautions and directions given in the discussion of the mixing and application of a glue should be followed both strictly and intelligently. On unimportant work a reasonable

degree of latitude is permissible.

The required amounts of glue and cold water must be weighed out in the proportions that have been previously de-termined for that particular glue, as described later in the specifications. If the glue is in the form of cakes, flakes, or ribbons it should be broken up into small pieces about the size of peas and soaked, in a covered vessel with the proper amount of cold water, until every particle is thoroughly softened. Ocof cold water, until every particle is thoroughly softened. Oc-casional stirring is necessary to insure the water's reaching every bit of glue, for if any lumps remain hard the prolonged heating, necessary to mell them, seriously lowers the quality of the glue. Even for powdered glue, the time of soaking must

be at least two hours.

The softened glue is transferred to water-jacketed glue pots The soltened glue is transferred to water-jacketed glue poist in which it is nitted as quickly as possible without overheating, in which the interest and the properties of th over an open flame or by the injection of live steam, because the local overheating injures the glue strength. Glue which the local overneaming injures the give strength. Once which has been heated for eight hours or longer must not be used. Likewise, any glue that has been heated at any time, on any day, must be rejected and not used again. The glue solution, once it has been heated, should never be allowed to cool, for

once it has been neated, should never be allowed to cool, for re-heated glie has not the same tenacity as a fresh solution. The room in which hot glues are applied should be free from drafts, and as warm as healthful working conditions will permit. The wood should be uniformly dry, and at least as warm as the room to prevent a sudden chilling and setting of the glue. The wood should, however, not be heated to too high a temperature, since hot wood readily absorbs moisture too high a temperature, since hot wood readily absorbs moisture from the glue, leaving it dry, and thereby lowering its elastic-ity. The wood surface should "fit" perfectly, he lightly toothed with a fine toothing plane, and he clean. The glue must be applied to both surfaces of the joint, and spread treely, and as rapidly as is consistent with good workmanship. Special care must be exercised to avoid the formation of air bubbles in the joint, which break the continuity of the glue film. These are due to carclessness in applying the glue or to foaming and frothing of the glue. Pressure should be applied quickly to prevent premature jellin or setting of the gine. A sufficient number of clamps must be used to distribute this pressure number of clamps must be used to distribute this pressure evenly over the entire joint that the surfaces may be in close contact at all points. The intensity of the pressure should be about 150 lbs. per sq. in. From 5 to 12 hours, depending on the character of the work, must elapse before the clamps are the character of the work, must enable before the champs are removed, and not for 24 hours may any sudden strain be put upon the joint. If the glied surface is very large, or if there are many laminas of wood, provision should be made for properly drying the wood. In the case of all lot glues, particularly, care must be used in maintaining sanitary conditions in the mixing room and glue room; all glue pots, containers, and brushes must be washed at the close of each day's work; all scraps of glue about the floors and tables must be removed.

Unless these precautions are rigidly observed fresh glue is liable to infection by bacteria which seriously impair its quality. Good glue has a clean odor. Decomposed glue must be rejected.

Hide glue of good quality, in spite of certain disadvantages, is recognized as being superior in strength to any other animal is recognized as being superior in strength to any other animal or vegetable glue. It is, therefore, used for propeller and all other histograde joint work. Because of its lack of water prooftiess it must be thoroughly protected by varnish or shel-lae. Bone and since glues and use in less important work: vegetable glues are extensively used for firmiture; fish and other liquid glues where strength or reliability are less neces-

Egg and Blood Albumer

Chemical Nature: The white of an egg is called albumen, and its chief constituent is what is known chemically as albuand its close consistent is with a known returnary as anomin, a viscous, nitrogenous substance, similar to the albumin of blood serum. Egg albumen is made up of 84.0% water, 11.9% albumen, 36% fat, etc., and 55% ash. (In further discussion the general term albumen will be used to mean albumen) min.) Albumens combine with both acids and bases to form acidic or basic salts, albuminates. With water they form perfeetly clear, odorless solutions,

feetly clear, odorless soutnous.

Manufacture of Egg Albumia: Eggs are broken and the whites carefully separated from the yolks. To obtain the clear albumen the whites are strained through silk gauze lining the drinn of a centrifugal machine, and allowed to settle for 30-40 hours. (The drinns of this machine must be lead lined to prevent chemical action.) An alternative method of clearing the allumen is to cool it in iron vessels for 5-6 days at a low temperature, a little tannic or acetic acid is sometimes used in the clarification. The clear albumen is dried as rapidly as possible in a stream of dry air or in vacuo under 120° F. (above this temperature the albumen turns yellow). Within 4-6 hours this process is completed, and the albumen is obtained in the form of thin, clear, clastic sheets. 100-125 eggs are required to yield a pound of the dry albumen,

The methods of producing blood albumen are very similar to those just described. Fresh blood from cattle is spread in shallow dishes and a separation occurs between the fibrin of the blood and the pale yellow serium. After this is com-plete, the serium is strained through silk gauze lining the drum of a centrifugal machine. As with the egg albumen it is allowed to setle 30-40 hours, when the albumen should be quite clear. It is then dried in the manner outlined above, and forms flakes, varying in color from gray to black according to the purity. The purest is of a grayish yellow color. The blood from one cow will yield slightly less than a pound

of the dry albumen.

A very pure albumen is obtained by forcing the serum through charcoal filters and precipitating the albumen by basic lead acetate. After washing, the precipitated lead albuminate is decomposed by rarionic acid and the lead removed by sulphuretted hydrogen. The albumen is then filtered and dried as before.

Preparation: Formulae for the preparation of these glues are still kept secret, both by the trade and the laboratories working on glue development. The dried allumen of course forms the chief constituent and to it are added amonia and lime. In preparing the glue the dry albumen is soaked for about 11/2 hours, and then stirred in a glue mixer for a few about 1½ hours, and then stirred in a glue mixer for a few moments. Amonia is added, the mixture again stirred a short time, and the lime in dry form slowly introduced while the stirring continues at low speed. After standing about an hour the glue is carefully poured from under any scum that may have formed on the top and is ready for use.

Application: Albumen glues must be applied hot, and the precautions necessary with all hot glues have to be observed. The room should be warm and free from drafts, and the wood surfaces at room temperature or alway. A machine spreader is used in applying the glue, and special hot presses are required for pressing and drying the glued parts. A considerable degree of care and skill is necessary for satisfactory results, Attention should be called to the very deleterious effects of foaming with albumen glues. Foaming is largely due to the air that is ground into the glue by the spreader. With extra The room should be warm and free from drafts, and the wood air that is ground into the glue by the spreader. With extra thick spreads of glue the pockets of air formed during the pressing are larger than with thin spreads. Wherever such a pocket occurs there is no contact between the faces of the joint. Foaming seriously impairs the strength and water-proofing properties of albumen glues.

Like casein glie, albumen glies are not glies within the strict meaning of the term but are cements; that is, upon setting their hardening is due, not merely to the evaporation of water in the glue, but to changes in their chemical composition. The presence of water will not, as in the case of animal glues, cause them to soften after setting has once taken place. because the chemical changes that have occurred cannot be reversed. Albumen glues are therefore practically waterproof when properly mixed and applied. They are also very strong, even superior to hide and casein glues under the best conditions, but because of the care that must be used in their application albumen glues are not so reliable as other types. Their chief use is in the manufacture of plywood. Blood since it is less expensive.

Casele

Chemical Nature: Casein, the chief constituent of casein glue exists in fresh milk, in a sake of suspension, as colloid, and is so finely divided that it can be separated by filtration only with great difficulty. Eighty-five per cent of the protein of milk consists of this substance. What is called casein of be regarded as generally a weak acid. Casein can be obtained from milk in two ways: by treating the milk with an acid, or by curdling it with remet. When milk is acted upon by an acid the lime casein compound is spilit up, and paracases in sacida, acting in their presence fice a weak base. In the curding of milk by remet, first the enzyme of remet spilits the lime casein into paracasein, the curd, and whey albumin, then lime casein into paracasein, the curd, and whey albumin then cased. Milk is spontaneously somed by lactic acid, produced by the action of lactic acid lacteria on milk susar. Considerable differences in physical action demical properties exist because the acid. Milk is spontaneously somed by lactic acid, produced by the acid not remet careful some casein solved by the acid not remet careful some classic and is not vicky.

Reference to the government specifications on casein, given later, show the general proportions of some of the constituents. The percentages of the elements present in cow milk casein, from analysis of a pure sample, are as follows:

Carbon .																		
Oxygen ,	٠,							 									22.8	96
Nitrogen																	15.6	%
Hydroger	1																7.0	96
Phosphor	1	1:	ś				٠,	 									.83	
Sulphur				,													.77	96

Manufacture of Industrial Caccin: As indicated above there are two general methods for the precipitation of paracascin: the first and more important is the acid, or natural some process; the second the remiter process. This latter method has expected the control of the process and the process of the process and the process are supported in the skimmed milk by lactic acid, or by either dilute sulphuric or hydrochloric acids. The yellowship precipitated present a labal (codium bicarbonate) and reprecipitated present, after the processed, after which it is stirred to pully with water (10) paracurd to 50 parts water). When this operation is completed it is steamed or cooked 23-30 minutes in a wooden vat with about 150 pars of a 15s solution of soda to remove the lactic milky high which is transferred to a separate vessel to cook milky high which is transferred to a separate vessel to cook

and there precipitated by dilute nitric acid. The casein collects at the bottom; the supernisant liquor is frawn off; and the casein is rinsed with water. The casein is allowed to settle in the water which is then very gently poured oil. This operacise in strained on filter cloths, pressed, and dried on trays in drying chaustless at 1021-1049° F. One hundred parts curful yield 45 parts of purified casein, free from lactic acid and butter fat. If the procedure just outlined is carefully followed, no trouble should be encountered in meeting the governments as to acidity, or fat and moniture contents.

Casein Glue

Chemical Nature: In all the various formulae used in the preparation of this sqlue the main constituents are casen, lime and softium silicate. In the presence of water the alkali reacts with the casen to form new compounds. The water proofness with the casen to form exe compounds. The water proofness estimated the control of the contr

		C. W. S. La-
•	Glue	boratory Glue
asein	36.00	44.65
alcium hydroxide	23.80	27.90
sodium silicate	17.00	14.85
ium arabic	5.50	7.55
Moisture	5.30	5.05
alcium carbonate	8.00	
Ammonia (free)	1.25	
ron, aluminum, magnesium (
oxides)	1.50	
Indetermined	1.65	
	100.00	100.00

The "Le Grandville" glue was a new, French, propeller glue; the C. W. S. L. glue, one that was developed by the Laboratory as an equivalent of the French glue. The casein used in the Laboratory glue was designated as "self-soured", "extra-fine" casein, and the lime was technically pure.

Since the special methods of inaunfacture of casein glue as well as the formulae employed are still trade secrets, the procedure followed by this Laloratory is of interest. One pint of gum arabic was distolled in five pints of 40% commercial water-glass (sodium silicate) and exaporated over a water the silicate gum arabic mixture was throughly mixed with calcium hydroxide of 150 mesh size and casein of 40 mesh size in the following proportions; casein 40, alkali 25, gum mixture 20. This mixture dissolves readily in cold water, more easily in fact than the Le Grandville glue and further-of water added to the mixture was 10 parts (by weight) of dry glue to 22 parts water.

(To be concluded)

UNIVERSITY OF WASHINGTON ANNOUNCES AERONAUTIC COURSE

F present plans materialize, the University of Washington will this fall offer a complete course in aeronautical engineering. The tentative curriculum proposed by Mr. J. W. Miller, who has charge of the work, is as follows:

First Quarter—Algebra, 3; engine prob-

lems, 3; general chemistry, 5; drawing, 3; woodwork, 1; military science, 2. Second Quarter—Trigonometry, 3; en-

gine problems, 3; general chemistry, 5; drawing, 3; woodwork, 1; military science, 2.

Third Quarter—Analytic geometry, 3; engine problems, 3; general chemistry, 5; aerodynamics, 3; woodwork, 1; military science, 2.

First Quarter — Calculus, 3; aerodynamics, 3; physics, 5; machine design, 3; metal work, 1; military science, 2. Second Quarter—Calculus, 3; English, 3; physics, 5; machine design, 3; metal work, 1; military science, 2.

Third Quarter—Aerostatics, 5; English, 3; steam engines, 3; steam laboratory, 3; metal work, 1; military science, 2.

First Quarter-Mechanics, 3; aeroplane design, 5; flying boat design, 5; direct current (EE), 4.

Second Quarter—Mechanics, 3; aeroplane design, 3; dirigible design, 3; alternating current (EE), 4; elective, 3.

Third Quarter—Structure of metals, 3; aeroplane metals, 2; aerial properties, 5; transportation, 3; elective, 3.

First Onarter—Business law, 3; thermo-

dynamics, 3; organic chemistry, 5; aerial properties, 2; elective, 3.

Second Quarter—Gas engines, 3; aerial mans, 2; organic chemistry, 5; elective, 5.

maps, 2; organic chemistry, 5; elective, 5. Third Quarter—Aeronautical engines, 2; ignition system, 2; organic chemistry, 5; thesis, 3; elective, 3.

At the present time no department of aeronautics has been authorized by the dearenautics has been authorized by the probability of the motion of the probability of the motion of the probability of the pr

building. Thus organic chemistry is included, as it includes investigations in dopes and fabrics used in present day construction. Should some other methods of construction supersede the present method, this subject would be eliminated from the curriculum.

The new Boeing Aerodynamic Laboratory will be utilized in this work. This wind channel was the gift of W. E. Boeing to the University of Washington. The channel proper is similar to those so successfully used at the Massachmetts Institution of Technology, the testing laboratory of the Curtiss Aeroplane and Motor Corporation, and the National Physical aeroplane designers are largely dependent on the results of these model tests in wind channels, it will be readily appreciated that the university's laboratory will be of unnost value to aeroplane builders. Much unnost value to aeroplane builders. Much property of the property of the contraction of the property of the property of it is hoped, will make possible a higher sandard of efficiency in aircraft.

AEROPLANE RADIO TELEPHONE APPARATUS

BY EDGAR H. FELIX, A., I. R. E., FORMERLY RADIO ENGINEER, SIGNAL CORPS

THE general attention which has been recently given the radio telephone by the general public, particularly since the demonstrations of the device at the Aeronautical Exposition and elsewhere, has led to a desire for an understanding of the operating principles of modern radiophone apparatus of the operating principles of modern radiophone apparatus of the contract of the contrac

At the Exposition, the incoming signals were amplified through loud-peaking megaphones, and hundreds of persons were given the opportunity of listening to radio telephone conversation between the demonstration booth, aeroplanes and dirigibles in flight, submarines and battleships in New York harlor and nearly land stations. It was possible to visualize the application of these devices abourd aircraft and submarines and particular type of loud-speaking outfits referred to above had been installed on submarine classers, the loud-speaking receiver being mounted on the bridge, and the speaking microphone attached to a flexible cord. It was thereby possible for captains on cooperating submarine chasers to control while closing in on enemy "subs, their words being amplified far above the moise of the motors, the straining of the ship and the hood of moise of the motors, the straining of the ship and the hood of

the wind. Those who were privileged to witness the voice-commanded flying conducted on the roof, the planes circling overhead, quickly and efficiently obeying the commands of those below, the drill field, could easily imagine the advantage voice-commanded combast squadrons had over an unco-ordinated enemy. The installation used is shown in Fig. 2. As Captain Ricken-backer watched the planes, he recounted several instances occurring in his own personal experience where a ground observer with radio telephone uniquenet could have warned the severe with radio telephone uniquenet could have warned the from above—in time to have made unnecessary the suprement could have sacrifice.

The power of concerted action, subject to constant modification in accordance with the exigencies of comfat which the tradiophone gives a squadron operating against an enemy, makes it infinitely more potent than a squadron which must depend upon the initiative of the individual aviator and his ability to carry out a plan of action against the enemy without recourse to any system of intercommunication with the other members of his squadron.

The Figs. 3 and 6 show various types of microphones, headgear and generators developed by the Signal Corps for aeroplane radio telephony. This work was conducted by the



Fig. 1-Mounting of high power radio telephone set in a flying boat, showing small space required

Radio Development Section, of which Lieuenant-Colonel Nugent II. Slaughter was Officer-in-Charge, and Colonel C. C. Culver was liaison officer for the Air Service. The aeroplane radio telephone outfit which had most extended application during the war, was that type known as SCR-68, the letters SCR signifying Signal Corps Radio. This sec consists of monthpieres and generators used are illustrated, and as well the transmitting and receiving apparatus mounted on the plane.

The power developed by the windmill driven generator is applied to the "vacuum tubes," the generators of the high frequency sustained oscillations which make radio telephony possible. The successful application of vacuum tubes to this purpose has been the greatest step in advance in the perfection



Fig. 2-A standard Signal Corps radio telephone transmitting and receiving equipment used for conversing with seroplanes in flight



Fig. 3—The radio receivers are incorporated in the helmet and ore also connected to the interphone between pilat and observer. The transmitter is strapped on the breast

of radio telephone apparatus of the last decade. Let us consider the principle of operation of the vacuum tube.

It has long been observed that if a plate of nickel or other conductor be inserted in an incandescent bulb, as shown in Fig. 4, which is highly evacuated, and if the potential of this plate be raised above the potential of the filament by means of a battery, a stream of electrons, constituting an electric current, will flow from the filament to the plate. It was asle so observed that current could be made to pass from the filament to the plate, but not from the plate to the filament. This effect has been utilized for the plate of the plate of the plate of the best plate of the plate of the plate of the plate of the best plate of the plate of the plate of the plate of the best plate of the best plate of the best plate of the plate of the

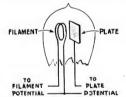


Fig. 4—The flow of current from a filament in an exhausted bulb is uni-directional

The quantity of electrons radiated from the filament is dependent on its length and the brilliancy to which it is lit. If the potential to which the plate is raised is sufficient, all the electrons radiated from the filament will flow to the plate. In practice, however, the plate potential is maintained at less than "saturation" voltage, as the voltage at which all the eletrons flow to the plate is termed. The result is that a "space" charge accumulates between the filament and the plate, which opposes and chokes off the flow of electrons to the plate as soon as it grows to sufficient magnitude.

In order to overcome the space charge, a "grid," consisting of three or four small zig-zag platinim-coated wires, is introduced between the filament and plate. This is shown diagramatically in Fig. 5.

Let us consider the effect of applying an alternating nursent on this plate. As the charge on the grid increases, it is assisting the accumulation of the space charge, thus choking off the plate current. Now, as the alternation reverses, the space charge is neutralized, and the plate current increases, as shown by the accompanying curves in Fig. 10.

The result is that the alternations on the grid are reproduced in greatly amplified form in the plate circuit. Considerable

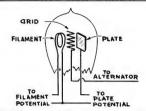


Fig. 5-The grid serves to dissipate the space charge and its potential determines the current flow in the plate circuit

amplification of incoming signals can thus be obtained. Frequently three vacuum tubes are connected in cascade, each can amplifying the signals of the preceding one, and amplifications amplifying the signals of the preceding one, and amplifications to the original strength of signal are obtained. This makes possible the design of loud speakers, which will take a week signal and so augment it that it will be which will take a week signal and so augment it that it will be audible two hundred feet from phones. In transcontinental telephony week voice current are magnified by this means so that clear and strong signals come in over a line three thousand miles store.

In the consideration of the amplifying action of the vacuum tube, I have assumed that an alternator was placed in the grid circuit. The fact has been established that any change in grid potential causes an exactly similar last considerable augmented current to flow in the plate circuit. The use of the vacuum tube the contract of the amplifying action. Instead of an alternator (see Fig. 8), a cold having from twenty to a hundreds turns of wire is placed between the grid and filament. Inside of this coil, inductively coupled to the grid coil, another coil of similar size is placed, which is connected between the plate and the filament.

Let us see what happens when the current is turned on and the filament lii. At first there is an instantaneous rush of current to the plate, through the coil of wire back to the filament. This rush of current is checked when the space charge begins to accumulate. As the current flows through the plate circuit, it bases through the roll of wire, causing a magnetic field to



Fig. 6—The source of power for the radio telephone is a small wind-driven generator, maunied on the landing gear



Fig. ?-A vacuum tube panel with rheestat for controlling fila ment brilliancy, filament ammater and plate circuit ammeter

surround it. This field interlinks with the coil in the grid circuit, causing a change of potential on the grid. This in turn causes a change of potential on the grid. This in turn causes a change of plate current, which again has its effect on the grid, through the intermediary of the coils. And so on. The frequency of these oscillations, which continue in perfect sine wave form, is determined by the size of the coils used. On aeroplane transmitters this frequency frequently reaches the figure of two million alternations per second.

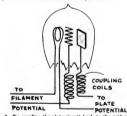


Fig. 8—By coupling the plate circuit back to the grid circuit a "repeater" effect is obtained, the grid serving as a trigger

To radiate these waves into the ether, it is merely necessary to couple the plate coil to the trailing antenua on one side and the "ground," which on beard a plane in flight is the motor and bonding wires, as shown in Fig. 9. A microphone is added in the grid circuit, which modulates the emitted currents to the vibrations of the voice. These are picked up by the receiving antenua, rectified and ambified as a legardy described.

We have successively described the functioning of the vacuum tube as a rectifier, amplifier and oscillator. All three of these functions can be performed at the same time by the same tube. On most Signal Corps apparatus, however, several tubes are used, each adapted to its particular function. Considerations of detail, however, are not within the scope of this article. As an illustration of how freely even the earlier types of bulbs could be manipulated, the reader will recall the conversations by radio telephone between Arlington and Honolulu, a distance of 5,100 miles. For this purpose, at least 300 tubes were used in the course of the experiments, and on several occasions as high as 500 tubes were generating currents at the same time.

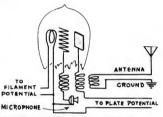


Fig. 9-The plate circuit currents, regulated by the voice, are passed off lato the ether through coupling coils

Aside from military use, the aeroplane radio telephone has been already used on passenger carrying planes. The aeroplanes which are used to ferry members of the Peace Conference between London and Paris are equipped with radio telephones, so that Lloyd George and Bonar Law can get in touch with officials during flight as efficiently as in their offices.

It has been demonstrated by General Kenly and Secretary Daniels that it is quite practical to use the commercial wire techniques and the commercial to the commercial wire technical to currents into radio waves, and converse over the circuit, partly wire, partly radio, without difficulty. By this means an aviator flying over the Alps can telephone by radio to a ground station below, his voice carried by wire to a high power trans-Altanic radio telephone transmitting station, transmitted to a radio receiving station in the United States, carried over the contiuent by the wire telephone lines, and re-radiated into the ether to a plane flying over the hardroof San Francisco.

The British Marconi Company is already prepared to give radio service aboard aircraft on terms similar to those applying to shipboard installations. We can, therefore, look forward to the time when radio communication will form an even more vital and important function in aerial commerce than in

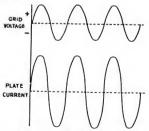


Fig. 10—The plate current is depandent on and faithfully repreduces all variations of grid potential, when adjustments are carrectly made.



NAVAL and MILITAD AERONAUTICS



Key to Abbreviations

ABC-Report to Army Balloon School, Arcadia, Cal. dia, Cal
AGC—Report to Aviation Supply Depot, Garden City, L. I., N. Y.
AWV—Report to Aviation General Supply Depot, Morrison, Va.
ARV—Report to Aviation Supply Depot, Richmond, Va.
BFT—Report to Barron Field, Fort Worth,

HHM-Report to Hazelburst Field, Mineola, L. L., N. Y.

L. I. N. Y.

KST—Report to Kelly Field, San Antonio, Tex. (When specified in the order in parenthesex.) Held in given in LDT—Report to Love Field, Dallas, Tex. LIV—Report to Langler Feld, Hampton, Cal. MDO—Report to McCosk Field, Dayron, Ohio. MIA—Report to McCosk Field, Dayron, Ohio. MIA—Report to M. San Ana San San Control of the Cosk Field, Dayron, Ohio. Report to Carenteer Field, Areaford, Fig. M. Despots to Langley, Field, Hampton, Vit. Report to Carenteer Field, For Worth, M.A. Report to McCost Field, Dayton, Observation Concentration Competition Consequent Comp. FFG.—Report to March Field, Dayton, Observation Comp. FFG.—Report to Rep. Field, For Station, Report to Care Judices, Columbia, S.C. PWM—Report to Payne Field, Wort Paint, Report to Care Judices, Columbia, S.C. PWM—Report to Payne Field, Wort Paint, Report to Care Judices, Columbia, S.C. PWM—Report to Care Judices, Columbia, S.C. PWM—Report to Care Judices, Columbia, S.C. PWM—Report to Care Judices, Care Judices,

Note 1-Report to places mentioned in the order named, Note 2-Report to Director of Air Service, Washington, D. C. Note 3-Report to Camp Lee, Va.

Note 4-Report to Camp Travis, Texas. Note 5-Report to Aberdeen Proving Grounds, Aberdeen, Md. Note 6-Report to Camp Jesup, Atlanta, Georgia. Note 7—Report to 461 Eighth Avenue, New York City. Note 8—Report to Camp Kearny, Linda Vista, California.

Note 9—Report to Military Attaches, Belgium, to assist in passport control work in Antwerp, Belgium, and will proceed to Brussels, Belgium, and report first of all to Military Attache, American Legation,

Note 10-Report to Camp Pike, Ark. Note 10—Report to Camp Pike, Ark.
Note 11—Report to Bureau of Aircraft Production, Pittsburgh, Pa.
Note 12—Report to Fox Hills, Staten Island,
N. Y., to General Hospital No. 41. Note 13-Report by letter of Chief of Con-struction Division, Washington, D. C. Note 14-Report to Letterman Hospital, San Francisco, Calif.

Special Ordera Nos. 89 to 95, Inclusive
Allis, Frank II
Birdsall, Carl AB
Stewar Stewar CAP
Burdick Howard
Barrall, Arthur Decator
C C
Costello, James Francis
Campbell, Jesse Frank. CAS Colbert, Lewis F CAS Costello, James CAP Curtis, Edward P. CAP, JM. Conant, William M., Jr. MAA Colambers, Reed M. JMA Coleman, Loring Wilkins. FLA Craig, Jitred W. Note 10
Davis Theodore P. CAP
Davis, Walter CCAP
1605y, Frank Languon. CAAP Downing, Blatchford. CAP Drayston, Harry C. CAP Dickensa, Willia A. JAA Dekk, Edwin Buehler. PLA Dicknoon, William Earle. MAA
Dickinson, William Earle. FLA Davia, Richard S. MAJ Dorsey, Floyd Leslie. RSD deObarrio, Peter. MAT
Eypper, George W
Fawrett, Roscoc F Fritz, Emanuel. CAP Fagan, Lambert Anicetus FLA Felts, Jess Alonzo FLA
Getty, Lorenzo T
Getty, Lorenzo T
Hogan, Harry C FRF
Hickey, Daniel F. B
Hogan, Harry C. H

•	field, Ohio.
	Howard, Clinton W
	Jewell, John B. FLA Johnson, Andrew B. CAP Joyce, Temple N. CAP
	Kelly, John M
	Lewis, Harry T
	Mabry, Dale CAP Malone, Paul CAP Martin, Frank E CAP McLaughlim, James Francis UAP McLorney, Robert Lee CAP Merkel, Richard Hans CAP
	Berkel, Richard Hans. CAF Morthan, Emil H. CAP Morton, Charles J. CAP Maguire, Frank Haim MAJ Mackie, Norman S. FLA McKee, Frank M. FLA
	Merkel, Richard Hans. CAT. Michian, Emil H. CAP. Magnire, Frank Haim. MAJ. Magnire, Frank Haim. MAJ. Mackler, Suman. S. P.A. Mackler, Amirec Jackson. MAJ. Morris, Brank M. M. P.M. Mertl, Frederick W. State Mertl, Frederick W. State McCarlingup, Massell I. See, S. M. McLarkhan, Lynn R. CAP. Mallagn, W. Sore I. McCarlingup, Massell I. See, S. M. Mallagn, W. J. S. Ooe I I.
	Newhall Norton L MAJ Noel Olen W Note 6 Niemann William E CAP Norton Oliver GAP Norges Stephen II JMA Nordhoff Charles FLA
	O'Brien, William Joseph FLA Odale, Walter B. Note 2 O'Rourke, Lawrence James KST
	Peters, Heber Wallace FLA Pouchee, Wayne C. Note 10 Porter, Kenneth L. JMA Paulding, Charles G. CAP Pierson, Norris E. CAP
	Richardson, John S., Jr. CAP Roberts, Charles S. CAP Roberts, Charles S. CAP Roberts, Charles S. CAP Roberts, Charles S. CAP Remolds John N. Note 2 Regners, John H. Note 3 Reitz, Charton E. FLIA Report, George M. Rote 10 Roberts Good Note 10 Roberts Good Not
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S
Sewall, SumnerCAP
Schroedl, Othello HCAP
Schroedi, Charlio HCAP
Stafford, Charles EmileCAP
Stevens, Albert William
Sturgis, Henry SCAP
Sturrock, WalterFLA
Steckle, John MFLA
Smith, Frank VFLA
Spatz, CarlJMA
Schiff, Loren D
Saltan, David L
Saltan, Pavid LNote 3
Soubiran, Robert
Sanford, Harold M
Saunders, William HJMA
Stookey, George Chanman
Thayer, Lucien Hamilton
U ·
Upington, Claude D. MAJ Usher, George L. Note
Unhar George I Note
W
Weller, Karl FFLA
Wickizer, Claude ErnestFLA
Wingate, Harry LMA
Watt. David
Wheat, Carl IFLA
Waterman, Cameron BeachMA
Washburn, William Day
Washburn, William 123

Recent Naval Orders Commander John 11. Towers, to command of C. scaplane division No. 1. Lieutenant Commander Marc A. Mitscher, to connection transatlantic flight.

Lieutenant Commander Patrick N. L. Bel-linger, Lieutenant Commander Albert C. Reed and Lieutenant Commander Robert L. Lavender, to connection transatlantic flight.

Licutenant David H. M. Culloch and Lieutenant Louis T. Barin, to duty in connection with N. C. scaplane division No. 1. Lieutenant Henry W. Hoyt, to assume command U. S. Naval Air Station, Akron, Ohio. Lientenant Robert D. Kirkpatrick, to naval air station San Diego, as executive officer. Lieutenant (junior grade) Ralph H. Norris, to duty naval air station, Montauk, L. I., N. Y.

Lientenant John F. Meloney, to naval air sta-on, Cape May, N. J., for dirigible balloon tion, Ca Lieutenant (junior grade) A. H. Beggs, to duty naval air station, Anacostia. D. C.

Army Aero Field to be Established at Camp Bragg

A flying field is to be established at Camp Bragg, North Carolina. It will be known as Pope Field, in honor of Lieut. Harley H. Pope, who lost his life in an aeroplane accident.

Reserve Naval Aviators Invited to Take Examination for Regular Service

Washington, D. C .- The Navy Department is preparing to invite requests from Reserve aviators who desire to take examinations for the regular service, pro-viding Congressional authorization is granted permitting a limited number to enter the regular navy. Only such reservists who pass special examinations will be permitted to enter the regular

Official Films of War in the Air to be Released by Signal Corps

Washington, D. C .- The War Department has officially announced that it will arrange for the release of thousands of feet of film, taken by the Signal Corps, of all phases of military activity, including training and combat work of aviators. These films will be released to form part of the film "news weeklies."

Kelly Field's Altitude Record Broken San Antonio, Tex., April 17.-Licut. W.

R. Sweeley broke the Kelly Field altitude record in a Curtiss JN-4H aeroplane, by reaching an altitude of 19,600 feet.

Demobilization of the Air Service PROGRESS IN DEMOBILIZATION

According to reports received from the Air Service the net decrease in the total commissioned and enlisted strength from the date of the armistice to April 10 was

68 per cent. The following table shows the distribution and per cent, of net decrease to April The strength April 10 includes only officers and men not yet ordered dis-eharged; it does not include 2,088 men at demobilization camps awaiting discharge.

Officers	men	20.586	6,609		
Total		190,627	61,491	68	
DEM OB	LIZATION	OF AIR	SERVICE	PERSON-	

NEL OVERSEAS The following officers are honorably discharged from the Service of the United

Air Service personnei overseas decreased 752 men, as against a weekly average of 2,457 during the eight preceding weeks. The strength of the Air Service in the United States and overseas is shown for

various	dates	m tuc	tonowigh	uiagiain.
			U.S.	Overseas
November	. 11		111,846	78,786
December	2		115,216	78,061
December	26		99.010	59.917
January	30		46,919	57,527
February	27		33,649	53,087
March 2	8		25,347	41,800
April 10.			20,636	40,855

Sixty-seven per cent. of the officers of the Department fo Military Aeronautics and 63 per cem. of the Bureau of Air-craft Production have been discharged.

Victory Button for All Whe Served in War Being Issued

Washington, D. C .- A lapel button will be issued to all officers and enlisted men (excepting members of the S. A. T. C.) upon forwarding discharge papers or duly certified copies to supply officer of the nearest military post, camp or station, in-

cluding recruiting stations.

The button for those wounded in service is of silver; all others receive a bronze button.

Signal Corps Issues Radio Instruction Book

The Signal Corps has issued its comprehensive radio instruction book, known as "Radio Pamphlet No. 40." This book was prepared for the rapid training of radio electricians at the Bureau of Standards under the direction of the Training Section of the Signal Corps by Dr. J. H. Dellinger, in collaboration with a group of radio authorities.

This book is an excellent instruction treatise for practical radio men, as it deals not only with radio theory and radio instruments, but covers thoroughly those phases of electrical engineering that apply to the radio art. In fact, 170 pages are devoted to A. C. and D. C. theory, motors, dynamos and storage batteries, and 180 cover thoroughly radio theory and prac-

The chapter dealing with vacuum tubes, their theory and use, is particularly clear and comprehensive.

Honorable Discharges

States: First Lieutenants Clarence N. States: First Lieutenants Clarence N. Walker, Edward J. Nolan, John H. Snyder, George E. Ramey. Second Lieutenants: Roger D. Acker, Carl H. Butman, William P. Boyd, Warren P. Gillelen, Jr., Charles J. Henderson, Frank S. Welsh.

New Commanding Officers for Love, Payne, Selfridge and Ellington Fields

Washington, D. C .- The following Special Orders, recently made public, an-nounce new commanding officers for several important field:

Lieutenant-Colonel Harvey B. S. Burwell, J.M.A., A.S.A., ordered from Rockwell Field, San Diego, California, to Love Field, Dallas, Texas, lo assume command. Texas, lo assume command. Major Clinton W. Howard, J.M.A., A.S.A., ordered from Rockwell Field, San Diego, Cal-lornia, to Payne Field, West Ponth, Missassippi, iforhia, to Fayne Freet, west Fornt, autonomous, to assume command.

Major Albert L. Sneed, J.M.A., A.S.A., ordered from Love Fleid, Dallas, Texas, to Washington, D. C.

Major Jacob H. Rudolph, A.S.A., ordered from Chapman Field, Miami, Florida, to Selfridge Fleid, Mount Clemens, Michigan, to assume com-

nand.
Lieutenant-Colonel Lawrence W. McIntosh,
M.A., A.S.A., ordered from Selfridge Field,
Jount Clemens, Michigan, to Ellington Field,
Jouston, Texas, to assume command.
Major John E. Russell, J.M.A., A.S.A., orered from March Field, Riverside, California,
J. Harchlural Field, Mincola, Long Island, New

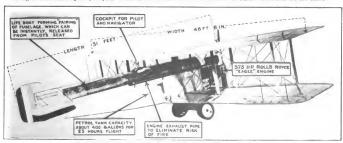
Officers Designated Reserve Military Aviators

The following-named officers, having completed the required tests, are rated as Reserve Military Aviators: Captain Lloyd T. Jones, Captain James A. Langston, First Lieutenant Hiram E. Wilson.

Navy Aviators to Attempt Speed Tests

Hampton Roads, Va., April 26.-Fol-lowing the announcement of the establishment of the 20-hour 1,250-mile naval endurance record, officers at the Naval Station at Hampton Roads declared that a even-hour speed test would be attempted in the near future.

It is proposed to use a faster fachine than the F-5 that made the endurance rec-York and Norfolk. Naval aviators believe they can make two round trips from Norfolk to New York within seven hours. if weather conditions are favorable.





FOREIGN NEWS



Chile Planning Insurance for Avlatora

A bill for the establishment of insurance for flying officers who have not come under the regulations for flying pay is under consideration of the Congress now in session.

Aerial Transport Route in Spein

Several French airmen are studying the problem of an aerial transport time between Toulouse, France, and Rabat, in Morocco. The route port lime between Toulouse, France, and Rabat, in Morocco. The route be the first landing place. Licotenant Lemainer will be directing pilot of the line. Two-seater hiplanes, powered by Salmson engines, built by the firm Latacorre will be used on the route.

Royal Aero Club of Catalune Establishing Landing Field

The Royal Aero Club of Cataluna is establishing a landing field not far from the ecuter of the city, in order to foster aviation in Spain. This will provide two laoding fields in Cataluna, for the Catalan Aviation School has its grounds on the outskirts of the city.

Vedrines, Pioneer Aviator and Record Holder, la Accident Victim

Vedrines, Pieneer Aviator and Record Holder, la Actidant Victim Paris—Jules Vedrines, a noted French aviator, was killed on Agril 21 when his machine fell is the Department of Dome while attempting 12 when his machine fell is the Department of Dome while attempting 10 miles. The properties of the Indiana Properties of the Indiana Jules Vedrines was one of the Insaling French airmen. One of the Jules Vedrines was one of the Insaling French airmen. One of the 1921 in actual green in Entrope, mining the Paris Morderi race, finishing fourth in the European circuit race, and making varous records for beading, distance and speed, and finishing seconds to the British circuit

beight, uitance und speed, and finishing account in the Britten errour SEME was not on the first orizons to By from London to Paris, doing this on August 4, 1911.

In August 4, 1912, he came to America and won the international area from roce at Chicago on September 9. In 1913 he flow from Paris to Veilines served in the French serial service early in the war and was later made un instructor. On Jissuary 19, this year, he accomplished the feat of Hunding on a roof of a building with an acroplane.

Candian Government Will Subsidie St. Murica Foras Protective Academic Value of the St. Murica Foras Protective Academic Value of the St. Murica Foras Protective Academic Value of the St. Murica Foras Foras Hot Miss seam to ESI. Murica Foras Foras Hot Miss seam to ESI. Murica Foras Foras Hot Miss seam to ESI. Murica Foras Foras Hot Miss seam to Establish to Idd in its task seam to the St. Murica Foras Hot Miss seam to Establish to Idd in its task seam to Establish the St. Miss seam to Establi

Progue Becoming Aviation Center

Prayue, April 7—Prayue is to become the great junction of air routes of regular service of "air buses" will be started soon to Praisu, Talyon Virma, a disance of 25 miles. Writing a disance of 25 miles place; will be started soon to Padau, Italy, we disance of 25 miles place; be duration of the trip being four hours and fifteen minutes. The machines used will be Italian transes with moment developing 2009 borspowers, and carrying forty-bors with moments.

Canadian Pacific Railway Aska Official Permit for Air Transport.
Ottawa.—The Canadian Paeric Railway Company will ask Parliament for authorization to aperate an sircraft service between such points
within or without the Domittion as it may find desirable, it was announced officially recently.

Echo de Paris Offers \$60,000 Prizes for Touring Flighta

The Belo de Paris so offering \$60,000 in prizes for a competition in which safety, and comined will be the chief consideration before the The corner will consist of some 20 stages (stabiling 2.500 milks. It will cover the principal towns in France and stretch into all neighboring countries except fermany.

Air Miniatry to Dispose of 30,000,000 Yards of Linen

In answer to a question raised in Parliament, an official of the Ministry of Munitions stated that the total stocks of linen on hand and available for disposal is \$1,970,725 yards.

Sespiane Bomber Converted Into Thirty Persenger Carrier By Air Ministry
London—In the Nay Deckmen the trials have been taking place of a guant asspinor when the Langingflip instead for war persons, and which has now been converted for commercial use. The text frish have given excellent results. The seaphen is driven by tree at the rear and one in front. The body of the machine will accommodate thirty passengers. The three more required 255 fixes of petrol and how for the hours can be made, as two petrol takes holding 1,110 litres of petrol cach are carried.

Four Rival Companies to Operate London-Amsterdem Service

Four Rival Companies to Operate London-Amsterdem Service It is stated from Amsterdam that no fener than four gradicates are preparing to start companies for establishing aerial services between theories have suggested to these syndicates that they should even to no agreement end form one joint company. Steps in this direction are accordingly being taken. Federation Aéronautique Internationale to Meet in Neutral Country

recreasion Aeronoutique Internationale to Meet in Neutral Country
At an early date, the first meeting of the Felderstein Aeronoutique
Internationale is to be held, probably, according to The deseptions, in a
country last ans neutral in the great sure. Assertedom, it is stated, in
the state of the state

New Title for British Cabinet Minister Representing Air Force The King his approved the substitution of the title "Secretary of State for the Royal Air Force" to that of "Secretary of State for Air."

Prince of Wales's Flight Over London

The Prince of free by Wassa Fugga Over Lookonge factory and serodome at Crekhen-edge-certary, and west long free an Handley Page machine, type 0.400, with two Rolls Royce engines. The pilot was Lecturant Carruthers, R.A.P., and the other passengers were Lady The flight lasted about one hour, and the machine passed over Buckingham Palace, the Houses of Parliament, Fleet Street, and St. Paul's

Cathedral.

The Prince spent some time with Lieutenant Carrothers, having the whole mechanism explained to him. While the wings were being folded back preparatory to housing the machine, another Handley Page aero-plane of the same type (0.400) passed over the Cricklewood aerodrome with Mr. Bonar Law on his way to Paris.

British Engineering Standards Association Prepared 130 Aircraft
During the past year and a half the British Engineering Standards
Association, 28 Victorias Street, SWI, has been responsible for the
Association of Switzer Street, SWI, has been responsible for the
Department of Aircraft Production. During this period some 70 British
standards specifications for aircraft insternial were along, and 60 more
over distributed to the makers by the department, as the whole of the
aircraft production of this econtry was under in centrol of the

Farman's Gelith Meles First Regular Paria-Brussels Flight With Distinguished Passengers

On Saturday, March 22nd, M. Arman's "Geliath" left TonssueleNolle, near Paris, on its first civilian passenger service flight between the French and Blogan equils, security of the parties of the product of the parties of the product of the parties of the parties of the parties of the parties of the passenger service flight between the parties of th

consister of Enghien (Belgium) was among the passengers, in return journey M. Ralael Guargila, Italian Charge daffarea at Brussels, was carried. The return journey was make on Scholwerd on in return, a brussel of the second of

Licut, Roget Flies from Marseilles to Paris in 3% Hours

Lient. Roget, who on January 36 made the double dicit across the Mediterracean, flee motored Breguet biplane in the remarkable time of 3% hours. The distance from Margar minutes. The acrags time for the errite flight was 143 miles an hour. By rail the postracy carriers 14 hours.

French Aviator Flies 560 Miles in 5 Hours Lieut, Janquet and two passengers flying from Alicante via Barcelona to Toulouse ac-complished the 560 miles in five hours,



The radio and instrument equipment for the Short Trans-Atlentic plane which Major Wood will attempt to fly from Ireland to Canada



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. NSHahon



A Speed Model Aeroplane

THE model shown in the accompanying grawing in wissue is what is known as a SPEED model, and some have been known to travel at speeds greater than 50 that one designed by the writer, which miles per hour. In fact, one designed by the writer, which was exactly like the drawing, and used in a speed contest held at Van Cortlandt Park about four years ago, travelled at the rate of 55 miles per hour.

These speed contests are held over a measured piece of ground one-tenth of a mile long, and the model must pass each point-that is, the starting and finishing lines-in order

to be officially timed.

to be ometany times.

It is a very hard thing to control these models, as the least little change in the wing surface or even a slight resistance on one side will make the model turn in a circle. I have seen model after model started in these speed contests and never reach the finish line, although they would cover much more ground travelling in circles than would be necessary in the straightaway distance.

Although the model in the drawing looks out of proportion and awkward, it is a very fine looking machine in the air, and the model huilder is well paid for his work by the flights

and the enjoyment he gets out of it.

These differ to the long distance models inasmuch as one need not travel as far to bring the model back after each flight, and, again, four sets of rubber are needed to complete the model.

While a speed contest will not be included in the coming contests, it would be well for models clubs who intend conducting a set of flights for prizes to include a speed contest ducting a set of nights for prizes to include a spece contest on the program, and I am sure that it will be the closest contested and most enjoyed of the program.

The expense of building a model of this kind is very low and one can be constructed from parts saved from wrecked

long distance models.

long distance models.

To construct the model proceed as follows:

Make the frame first of ½ x 3/16" spruce 30½" long. The
ends of each longeron is tapered slightly and fastened together with thread and glue forming the apex of a "V. This frame

is known as an "A" frame and is the strongest known for model construction. A piece of spruce 14 x ½" and about 17" long is given a stream-line shape and fastened across the main longerous at a point a few inches from the rear, as shown. This becomes the hanger for the outside propellers. shown. Into becomes the findinger for the outside propelliers. This spar must be braced at the ends with a piece of bamboo running from the ends of the spar to the longers. This takes up the pull of the rubber motors. Hearings made of 1-32" LD brass tubing about 34" are soldered to strips of brass and fastened to, the ends of this spar. Two more

brass and fastened to the ends of this spar. Two more bearings made of a piece of tubing with a copper washer soldered to each and fastened by inserting into a block of wood are fastened to the ends of the longerons, on the top side. These bearings are for the inside propellers, etc. 8" in diameter. There are four in number and all are pushers. The best way to make the wings is to procure a piece of white pine or clear spruce 3/16, thick, 3 x 22", and sandpaper one side to a smooth finish. This side is the under side of the wing. The top should then be shaped to a true wing shape and sandpapered to a smooth finish, as before. Then the wings from solittime many model builders elbe silk to the wings from solittime many model builders elbe silk to two coats ot sheliac should be applied. In order to keep the wings from splitting many model builders glue silk to the under side of the wings and after drying press it with a didfuted with accessor or banana oil is applied to give it strength. The wings should be fastened on to the model with rubber bands to allow free movement forward if the model should

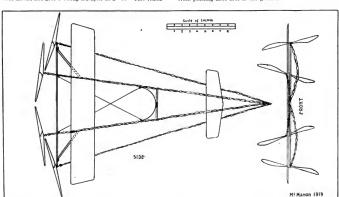
strike the ground forcefully The balancing of a model of this kind is very difficult, and

it requires patience and many tryonts before the correct balance is found. balance is found.

The proper way is to wind the rubbers up to their full capacity, and have the main wing about away from the first or outside set of propellers. The elevator should be up to about 4 inches from the apex of the "V" and should have the front edge elevated about ½" higher than the trailing edge.

When the model is released it will be easily seen whether the model is correctly balanced or not, and it will be protected.

from pitching nose first to the ground.





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. It symptoms vary in each case and each wittin has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Man Who Stayed at Home

(With apologies)

l have a "gold" lientenancy, A "shave-tail" in the A. S. C., I'd like to fight for Liberty, But I must stay at home.

I've not a worry or a care.

The greatest danger that I dare, Is slipping from my swivel chair; I have to stay at home.

I've got about as much a chance Of getting over there to France As dead canaries have to dance, And so I STAY at home.

Each day I ask the Colonel please With tear-stained cheek and bended knees, To only send me overseas,

But still I STAY at home.

He puts my name upon the shelf, And wishes me the best of health

And says he can't get there himself-And so I STAY at home.

I see myself in future life, With carcass free from wound or strife, Explaining to my loving wife, Why I had STAYED at home.

-S. B. S.

In Air Service Parlance

Private "C.C.Pill" inserted the following brief notation in

How Do They Do It?

(Lieutenant Thompson is an Air Service cadet, watching the mechanics true up his plane for his first solo flight.)

Lt. Thompson to Mechanic: "What's the trouble with this

Mechanic to Lt. Thompson: "Sir, the bearings are burned out." (Lt. Thompson looks at mechanic in astonishment.)
Lt. Thompson to Mechanic: "I thought these ships were

equipped with fire extinguishers?"

Mechanic to Lt. Thompson: "Yes, sir; they are."

Lt. Thompson to Mechanic: "Well, why didn't you use it?"

The Transatlantic Flight

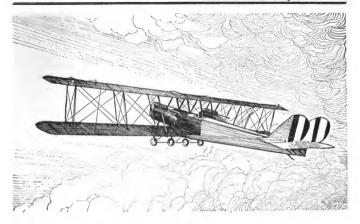
Unto the 'wakened Element, its lover: The Aeroplane, flying over! Midocean hears those wings The high adventurings Of man's soul, so desiring The upper skies-so long aspiring! Always there have been ready Heroes whose wills were steady Who were in love with the Unknown, How soon to come into their own! Even now, they robe for flying-They, the Undying! Yes, though they were to fall, 'Twere to Valhalla's hall! Shine, sun and moon of Ajalon, Such deathlessness upon! Wane, tempest, and be gentle, storm, When wings the Chosen's form! O sunlight, flash on This new, immortal passion, This heaven-intoxicated science. Irreverent, but absolved defiance, Man's powers gloriously taxing Earth at your waxing, And answering aether tidal. This is your ever-destined moment bridal.

Isabel Fishe Conant, in the New York Times.

MUTT AND JEFF-They Attempt a Transatlantic Flight By BUD FISHER



-From the N. Y. World.



Valsparred in war and peace-

THE Glen L. Martin "bomber," no longer needed for warlike purposes, has demonstrated its value as a commercial machine—

And it's still Valsparred, of course.

Recently this airplane, equipped with two Liberty motors, flew from Pittsburgh to Washington (175 miles) in one hour and fifteen minutes, making a record.

The "fast express" airplanes now being developed to carry on the work of peace, must be varnished with Valspar to attain highest efficiency. No other varnish embodies both the elasticity necessary withstand the terrific vibration, and the

water-proofness necessary to resist the erosion of moisture particles driven at enormous speed against the airplane surfaces.

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A Three Months Record

From the First of January to the end of March-three months-AERIAL AGE readers had a greater volume of authoritative material presented to them than the readers of any other aeronautical publication in America. The following is the remarkable record:

151 Pages Technical Material

17 Illustrated Aeroplane Descriptions

20 Illustrated Motor Descriptions 610 General News Paragraphs

491 Illustrations

371 Advertising Pages

Since the Signing of the Armistice

Much engineering data of great value could not be published on account of censorship regulations prior to November, but when the censorship was lifted AERIAL AGE was

The First to Describe

(1) The Liberty Motor, devoting fourteen pages to a complete description, including fifty illustrations.

(2) The Hispano-Suiza Aviation Motor, telling the complete story with twenty-six illustrations,

(3) Description of Naval Aircraft Factory with many photographs.

(4) Duesenberg 850 H.P. Motor, with complete illustrations

and diagrams.

(5) King-Bugatti Motor, sixteen pages and forty illustrations.
(6) The N.C-1 Flying Boat, Caproni Triplane, Standard Handley-Page, Standard El Defense Scout, Standard Postplane. Christmas Bullet, Bellanca Biplane, Gallaudet Seaplane, Le Pere Fighter, Ordnance Scout, De Haviland 4, Breguet-Biplane, Sunstedt Seaplane, etc.

(7) Complete report of Hughes Aircraft Investigation. Complete aircraft reports by Secretary Baker, General Kenly, Secretary Daniels, J. D. Ryan, and Postmaster General

Burleson.

(9) Aero Club of America plans for Captain Bartlett's flight to the North Pole to explore 1,000,000 miles of unexplored territory, to collect data on air currents as well as to make soundings in the Polar Basin.

(10) The extensive plans of the Aero Club to foster aerial transportation, sport, etc., with list of seventeen trophies and prizes to be competed for during the coming year at Atlantic City.

This editorial record is unequalled by any other American Aeronautical Journal. If you desire to

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FIRE-AUTOMOBILE-TORNADO-EXPLOSION-RIOT AND CIVIL COMMOTION

(Continued from page 386), brush, quality and naure of soil, geological features and other facts of interest to the lumberman. If photographs were taken with a stereoscopic camera, they could be viewed through a stereoscope and undulations of the ground which would tell the direction of the flow of streams could be observed.

The great saving of time, the increased thoroughness of the work and the increased efficiency of the logging parties sent out would not be the only inducements for the use of aerial photography in the lumber industry. The lumber man would have a permanent photographic receivement of the present of the present set of the preceding to the preceding the preceding to the would find that the aerial map is not only more satisfactory and more quickly obtained, but it can be obtained at a lower cost than survey from

tained at a lower cost than survey from the ground.

Arrangements with the Canadian air

police service and lumbermen are suggested, as this would be considered preferable to the use of privately owner aircraft. This would obviate the necessity of having planes, operators and cameraa. The cost of producing photographs is \$400 per dozen. In addition to this there of the aviator. If an organization, such as the Northwestern Mounted Police, is cupiped with aeroplanes, service to the lumbermen could be rendered sufficiently cheaply to be a commercial proposition.



Air Service Demobilization

Commercial Aerial Transportation Concerns will find it to their advantage to write to

The Aerial Register

(To appear shortly under the auspices of AERIAL AGE WEEKLY)

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Aerial Surveyors
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Aerial Photographers
Aeronautical Chemists

Aerial Traffic Managers
Aircraft Inspectors
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Instructors
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Rigging Specialists
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Equipment Experts

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Additional Honors Won in the Air by

Americans
There follows a list of American officers who have won decorations according to the records in the War Department; whose names do not appear in the official list previously issued and published in the March 3 issue of AERIAL AGE:

Croix de Guerre

Cross Legion of Honor, French Lieut. Colonel Bert M. Atkinson., Newman, Ga. Lieut. Colonel Lewis M. Brereton, Washington, D. C. Capt. Edward V. Rickenhacker., Columbus, Ohio 1st Lieut. Fred A. Tillman.....(No address)

Military Medal, British

Adj. Bert Hall, French, Pilot ... New York City

District Supervisors

The offices of District Supervisors of Air Ser-vice Activities in the following named districts have been ordered abolished, effective March 31, 1919:

Eastern District,—Headquarters, O. D. M. A., Executive Section, Supervisor's Branch. Southcastern District,—Headquarters, Mont-gomery, Ala. Northeastern District,—Headquarters, Indian-apolis, Ind. Southern District,—Headquarters, Indian-

Southwestern District,- Headquarters, Dallas,

Texas. Western District,-Headquarters, Coronado, California.

Cattornia.

The functions heretofore performed by District Supervisors will, in the future, be exercised by the office of the Director of Air Service, and by Department Air Service officers in accordance with definite instructions to be promulgated later.

Cited for Distinguished Service

The Commander in Chief, in the name of the President, has awarded the distinguished service cross to the following named officers and soldiers for acts of extraordinary heroism described after their names: Second Lieut. Clinton S. Breese, observer, 12th

Second Lieut, Clinton S. Breeze, sharerer, 12th Acre Squadra, For extraordiary hereion in action near Argonne, France, November 2, 1918. Reves and his pilot sere attacked, by four census planes and driven back, but realizing the important control of the control of the card and driving the others navay. Ulmindful their own danger, they then five for an hour within 105 meters of the ground through a securately located our front his positions. How address, R. F. Breese, fasher, 115 McCall Street, William and Call of the control of the control

First Lleut. Kenneth H. Holden, pilot, 12th Aero Squadron. For extraordinary heroism in action near Argonne, France, November 2, 1918.

With on an infastry contest mission Livest. Inside and shinders and driven back, but realizing the cenney places and driven back, that realizing the current of a street in the control of the control of

officer sowed the meemer trees various the con-trol by the control of the control of the con-trol of the control of the control of the con-pensation of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the con-trol of the control of the con-trol of the con-trol of the control of the con-trol of the con-tr

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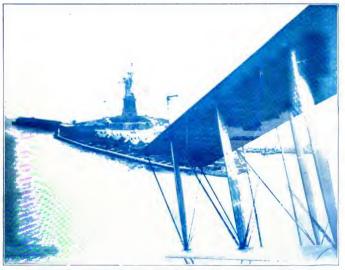
AERAEAGE

WEEKLY

Vol 9 No 9

MAY 12, 1919

10 CENTS A COPY



The Statue of Liberty as seen by Aerial Cruisers on their way to the Atlantic City Aeronautic Exposition

Second Pan-American Convention Great Success

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Subscription: Domestic, \$4; Foreign, \$6 Entered as second-class matter March 25, 1915, at the Peet Office at New York, under the act of March 3rd, 1879.

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the following patented features will be recognized as indie pensable to any type of retractable chassis:

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For Engineering data and License apply to

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THE NATIONAL TECHNICAL, ENGINEERING AND TRADE AUTHORITY

PUBLISHED WEEKLY BY THE AERIAL AGE CO., Inc., Foster Building, Madison Avenue and Fortieth Street, New York City WASHINGTON OFFICE: 619 Union Trust Bidg.

LONDON OFFICE: Thanet House, 231 Strand, W. C.

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VOL. IX

NEW YORK, MAY 12, 1919

NO 9

SECOND PAN-AMERICAN AERONAUTIC CONVENTION GREAT SUCCESS

Winston Churchill, Admiral Lovatelli, President Menocal, Santos-Dumont and Other High International Officials Send Greetings

Important Scientific Demonstrations

THE country at large is applauding the Second Pan-American Aeronautic Convention and cables are re-ceived daily from high authorities in different countries greeting the advent of the convention. The Hon. Winston Cliur

Hawley, said :

Hawley, said:
"All good wishes for the success of the Pan-American
Aeronautic Convention. May this new art and science prove Accommune Convention. May this new art and science prove a bond of kinship between the English-apeaking people. The art of the provided in the particular that the same are the same and the particular that the same are the provided in the paintaking study of the means of mutual protection.

In opening the Convention, Secretary of War Baker sent the following wireless:

"I send greetings to the Second Pan-American Aeronautic onvention. Here in France one sees the great triumph Convention. which has been achieved in aeronautics during the war and American contribution, its value and significance." Subsequently, Secretary Daniels sent the following wireless

message: "I regret that absence from the country denies me the pleasure of being present at the Second Pan-American Acronautic Convention. My visits and conferences with aeronautic experts of France, Italy and Great Britain convince me that the largest field of adventure and invention lies along the line of the further complete conquest of the air. Inassuuch as the first flight was made by Mr. Wright in America, I trust that the Government of our country and the citizens of America will heartily and earnestly advance this science which means so much to mankind." Rear-Admiral M. Lovatelli, Italian Naval Attaché, trans-

mitted the following communication from Gabriel D'Annun-

zio:
"I have the honor of transmitting to you the following radiogram, which has been forwarded by Admiral Delbono, the Italian Minister of Marine: 'People of the Union, gathered together to assume the conquest of eternal Heaven toered together to assume the conquest of eternal steaven to-day, the salities of Italy reach you as warmly as when in that distant April you sprang up in defense of the eternal spirit of man against the menuce of barbarism. In the mo-ment of its grave grief, Italy calls upon the people of George Washington and Abraham Lincoln to present the unjust sac-rifice of those who have given all for the glorious cause. People of the Star Spangled Banner, make sacred by noble



U. S. Army, Novy and Marine Corps delegates at the Second Pan-American Aerosautic Convention, photographed with the representatives of the commerce, sheer Cub of America disclaig. Edite Sinness and Miss Stimens, at the Attaintic Urit Airport. Major Reed G. Landis, sender ranking American Ace, is shown next to Colonel Herr, Captain Bace, French High Mission and Major F. F. Evans, U. S. Marine Corps are shown on the left

testimonies the day which glorifies in yourselves the most noble thing in the world, the wing of man and of liberty. Gabriel D'Annunzio.'"

Gabriel D'Annunzio."

The Honorable Victor Hugo Barranco, special representative of President Menocal, of Cuba, flew to Atlantic City from New York in a Curtiss aeroplane piloted by Aviator John Rolff, carrying wireless greetings from President Menocal to the Convention reading as follows:

"The marvelous progress already attained in this me field of human activity, made possible by the genius and concerted efforts of so many of your countryme, and the brilliant part taken by American aviators in Democracy's trumph over the

forces of Autocracy in the great conflict so recently brought to a glorious end, contains the promise of still greater things for the near future.

"Permit me, therefore, to again congratulate the Aero Club for its magnificent work and to offer my sincere co-operation in everything that it may be within my power to do to contribute to the success of its efforts for the extension of aerial communication between the North and Latin-American councommunication between the North and Latun-American couli-tries; such facilities will promote the advancement of culture and commerce and serve to draw still closer the already friendly ties uniting our respective countries. (Signed) M. G. Menocal."

The Royal Aero Club of Great Britain cabled the follow-

'We learn with pleasure of the great awakening of interwe learn with piesaure of the great awarening of inter-est and enthusiasm for the cause of aeronautics for which our respective clubs have always worked together. We greet your airmen and wish you great success. (Signed) President, Royal Aero Club."

Mr. Alberto Santos-Dumont, the famous pioneer airman and President of the Pan-American Aeronautic Federation, who was prevented from coming to Atlantic City this month,

who was prevented from coming to Atlantic City citis month, but will come in June, cabled as follows; "The discussion of important aspects of modern aviation, the outdoor demonstrating of aircraft and the exhibits on the Steel Pier at Atlantic City are all bound to create a popular interest in aeronautics that will certainly make for the prog-ress of all branches of aviation. This Pan-American Con-vention and Exhibition is a fine thing for aeronautics, and vention and Exhibition is a fine thing for aeronautics, and should be productive of wonderful results. It is an important factor for developing cordial relations between the American Republics. (Signed) Alberto Santos-Dumont."

The Norwegian Aero Club cabled from Christiania, Nor-

The Norwegian Aero Club cabled from Christiania, Norway, as follows: Committee of Pan-American Flying Exposition, Atlantic City, the compliments and hearitest congratulations from Norwegian Aero Club. (Signed) Norwegian Aero Club. (Chili, General Pinto and Carlos Silva, who were present at the exeremony, brought a message of greeting from the Chilian Government and the Aero Club of Chili.

Aero Club of Chili.
Greetings were also read from Rear-Admiral Robert E.
Peary, President of the Aerial League of America; President Emanuel Estrade Cabrera, of Gustemals; President Porras, of Panama; from the President of Haiti; from the Minister of Public Instruction of Venezuels; from the Minister of the Interior of Ecuador, and from Paraguay, Uruguay, Mexico, Couta Rica.

Parachute Demonstration

The first public demonstration of "Life preservers of the Air' was staged as one of the special features of the Second Lieut Lead of the special features of the Second Lieut Lean Orts, the noted French aeronaut, whose genius is responsible for the newest aerial safety device, ascended in an aeroplane piloted by Eddic Stimon. As the machine in an aeroplane piloted by Eddic Stimon. As the machine feet over the heads of the beholders, Lieut. Ora, who occupied the seat directly behind the pilot, stepped over the ovel and leaped into space, releasing the air life preserver, which is a new type of parachule, by the jerk of the main suspending rope as he went over the side.

rope as he went over the side.

Stinson and his aeroplane sailed on in the straightaway.
Crowds below caught the flash of Lieut. Ors' body as it was cataputted from the machine by the tremendous speed of the aeroplane. In a split second the umbrella-shaped top of the parachuse spread out in a white canopy of safety over his tead.

The straight of t



Major Themas S. Baldwin, Director Atlantic City Municipal Air Port, the first air port in the world

jumped from the aeroplane just as it swung out over the waters of the Thorofare.

The first to congratulate him was Engineer-Commander.

K Kitishima, of the Japanese Imperial Navy, who represented his Government at the field. The Nipponese observer showed keenest interest in the construction of the parachute, while the erowds rushed up to greet the aeronaut as he released himself from the harness to which the ropes of the parachute were fastened.



Engineer Commander K. Kitashima of the Japanese Imperial Navy and Rear Admiral W. N. Little, U. S. N., retired



Lieut, Jean Ors, who demonstrated his marvelous parachute for aeropiane service



Lieut, Ora in one of his parachute descents from an aeroplane

There were two remarkable features that caught the atten-There were two remarkable leatures that caught the attention of the speciators. First it was noted that of all the national configuration of the speciators and the special configuration of t

minutes after he had finished the test, Lieut. Ors

test.

Ten minutes after he had finished the test, Lieut. Ors showed the practicability of the parachute for commercial purposes. Using a smaller type parachute, he swept into purposes. Using a smaller type parachute, he swept into rock attached to demonstrate how the contrivance could be employed in dropping mail bags or other packages in a safety. Although the wind had freshened to twenty miles an hour, the parachute delivered its goods do feet from the designation of the control of the designation and foreignation of the designation and foreigna ganizations and representatives of the American and foreign

press.
Lieutenant Ors won the \$500 special prize for Aerial Life Preservers and may win the \$500 prize offered by Mrs. Louis contest for which will last during the entire month. The prize was paid in Liberty Bonds by the Contest Committee of the Aero Club of America.

prize was paid in Liberty Bonds by the Contest Committee of the Aero Club of America.

The Committee of the Committee of the Aero Club of America Present were: Commander A. Dong, Armong the officials present were: Commander A. Trindale, Portuguese Naval Rar Arlatache; Capt. F. C. Sejerstere, Swedish Legation; Engineer-Commander K. Kitishima, Imperial Japanese Navy; Rear-Andmiral W. N. Little, U. S. Navy (retired); Capt. C. Berisso, Milinary Altache, Urneuay Legation; Vicer Hugo Blarramo, Representative of Chila; Capt. Prop. Committee of Chila; General Pinta, Representative of Chili; Lient, Edgar Henry Garland, Royal British Air Force; Capt. G. Lennstrand, British Royal Mri Force; Lieut. Santiago Cavipugano, French Air Service; Major. S. Herbert Mapes, of New York Aerala Nicola, Major. S. Herbert Mapes, of New York Aerala Nicola, Major. S. Herbert Mapes, of New York Aerala, W. H. Hayl, W. Woodhouse, Member of Board of Governors, Aero Club of America; Mr. Charles Elliott Warren, Member of Board of Governors, Aero Club of America; Col., Iefferson De Mont Thompson, of New York Aerial Police; Mr. Hught. Willoughby, member, Contest Committee, Aero Club of America; Mr. Fred Wagner, Official Starter; Major Reed G. Landis, second ranking American Aee, late of Air Service, U. S. A.; Mr. Edward Stinson, Aviator.

Intercollegiate Trophies

S. Raymond Beckwith, University of Pennsylvania water polo star, captured the first of a series of intercollegiate sea-plane races that were a late afternoon feature over a threemile circular ocean course off the upper beach, with the Steel Pier, headquarters of the convention, as the central point. The college boys covered a total distance of 30 miles.

The contest was particularly interesting by reason of the fact that there was a keen rivalry for the family honors between the Penn Beckwith and his brother, Ensign A. A. Beckwith, representing Yale, who finished third.

The University of Pennsylvania time was 23 minutes and 26 seconds, which gave Mr. Beckwith the first prize of \$250, and he also becomes the first holder of the annual intercollegiate Trophy.

The second prize of \$150 was won by Ensign M. S. Martin, with Lieut. R. M. Craigmyle, as passenger, representing Columbia University. Ensign Martin's time was 25 minutes and 13 seconds.

Ensign Beckwith, who landed Yale's colors third, won the \$100 prize with a time of 26 minutes and 51 seconds, while

the fourth prize of \$50 was won by Augustus Post, representing Amherst College. His time was 29 minutes and 3 seconds.

In the contest for the Intercollegiate Trophy for Land Aeroplanes, which was held at the Atlantic City Air Port, Columbia, represented by Lieutenant A. L. Smith, covered the ten laps in 10 minutes and 30 seconds, winning the first "expense money" prize of \$250 and the first claim on the \$2,000 trophy.

Yale, represented by Ensign Alfred A. Beckwith, covered the ten laps in 13 minutes and 35 seconds, winning the second

Columbia, represented by Lieut, Guy S. Lennstrand, covered ten laps in 14 minutes and 39 seconds. Pennsylvania did not participate in this land aeroplane race.

Woman's Flying Trophy Offered

Miss Marjorie Stinson, sister of the noted aviator, Eddie Stinson, who has won a number of honors during the races of the Second Pan-American Aeronautic Convention and Exhibition, arrived at Atlantic City today and gave a number of flying demonstrations at the Atlantic City Air Port.

The interest created by her flying was great, and Mrs. May Brown Dietrich of New York, the daughter of ex-Governor Brown of Maryland, immediately offered a trophy to be



Lieut, Edgar H. Garland, Lieut, Santiago Campu A. A. Beckwith were three of the con-

competed for annually to be known as the Women's Flying Trophy.

trophy was offered through the Aerial League of America and a Committee is being appointed to make the rules for the competition, which will start at Atlantic City Air Port next Saturday.

Blimp Bombards Pier and Boardwalk with Victory Loan Literature

A giant "blimp" that cruised up the coast from Cap May under orders from the commander of the Fourth Naval Aeronautical Congress on the Steel Pier and the Boardwalk with Victory Loan literature. The big dirigible, with a navy crew, entertained the thousands along the Boardwalk with its graceful maneuvres over the combers. Maj. Mages, in charge of the Avaistion Department of the New York Police charge of the viviation Department of the New Tork Folice Department, wig-wagged commands to the ship, which responded instantly to the signals as they were delivered, taking direction and executing turns as he instructed. The novel performance proved to be one of the most interesting features on the day's program.

Sunday Memorial Service

Dramatic was the tribute of the Second Pan-American Aeronautical Congress to the eagles of the allied nations who agave their lives in the cause of himamity. The setting was impressive when the prelude to the memorial services at the Aeronautic Hall on the Steel Pier started.



B. H. Kendrick and E. K. Jacquith, who are taking a promi-nent part in the competitions

Hundreds inside, sitting with bowed heads in silent prayer, suddenly heard the whirr of propellers and the throb of engines overhead, singing the eulogy of the comrades gone over the horizon to their reward. There came a soft thud on the roof of the big auditorium-another-then in quick succession came others above and at the sides of the build-ing. A blotch of red flashed past a window near the front succession came ourses are the front of the stage on which sat the international representatives, of the stage on which sat the international representatives, above the audience dropping rowes frout to stage, the stage of the valiant airmen who made the supreme sacrifice. The air partol continued all through the meeting, while crowds on the pier decking watched and bared their heads each time the winged squadron passed over.

The services inside were presided over by Secretary Au-



Lieut, Chas. E. Ruttan, U. S. N., whose remarkable paintings are being shown for the first time on the Steel Pier



Official representatives of twelve nations who witnessed the tests of the new "aerial life preserver" used by Lieut, Jean Ors

gustus Post, of the Aero Club of America and the Aerial League of America. Mr. Post stressed the fact that selfsacrifice was the great spirit of America during the war—the spirit carried to Europe by the Yankees. He referred to the heroes whose memory the services honored today as noble examples of that spirit.

The Rev. Henry Merle Mellen, of the First Presbyterian Church, this city, who delivered the eulogy of the day, said in part:

"The dirge that we with peculiar fitness should sing at a service of this kind is suggested in Miss Adams' immortal hymn. "Nearer, My God, to Thee." The spiritual song writer must have had a kind of vision of these latter days, when the sons of men are so wondrously 'on joyful wing cleaving the sky." Nay, she must have had some divinely fine sense of such men as we honor today when she continued, 'sun, moon and start forgot, unwards I fly."

moord and stars forgot, upwarus I pro-"Cleaving the sky, these men soared to wonderful physical heights, and from the greater heights of duty and achievement took the property of the stars of the stars of the thought of the stars of the stars of the stars of the throne of God. They ascended to the summit of heroic service and thence vaulted serency to the realm of the Immortals. They were marryes of the New Faith, which is not a new, but the old, perennial faith that bold souls have in the progress of the race toward higher and more spiritual achievement.

"True, they loved the adventure of the world above the sky line. They risked their lives in hazardous undertaking for the sheer peril of the thing. And probably not one of them could have given a clear-cut definition of the moral reason within him as he ascended over battlefields or training ramps. Nevertheless, they have told us by their eloquent sacrifice, that it is better to die in undefined moral adventure complacent self-satisfaction. When we draw around them the larger circle of the Great World War and its tremendous moral issues, we are justified in clothing them with the light the imprired writer many centuries ago, is 'the light that lightenth every man that cometh into the world.' They knew that light was in them and were satisfied, even in the Divine not a single form of life is lost—never! Each spark of life and to the onward way of progress.

W. W. Young, the first life member of the Aero Club of America, said:

"In the early days of the war Lord Kitchener, the greatest and most far-sighted general of his time, is reported to have said that an acroplane, to him, was worth a division of troops. "That was when aviators were merely the 'eyes of the Army." Soon they became the teeth, the cutting edge; and Freedom. "The way was the control of the control of the control of the cutting edge; and the precedom."

"Before such a gift at such a cost we stand awed and helpless, but we can at least acknowledge our obligation and sympathy for those who feel, perhaps, even more than ourselves, the worth of the price paid. So I have the honor to

propose this resolution:
"BE IT RESOLVED, That we, members of the Second

	Major Ci	Atlantic City			Date _	
Name and Address of Pilot	Name and Address of Passenger	Place of Start	Machine Type and No.	Time Left	Time Arrived at Air Port	Time Started from Atlanti City Air Port
			CONTRACTOR OF THE STATE OF THE			
Type of Motor						
Make of Propeller		and a co	_	_		
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		Signature of Inspector	or Observer			

The first "Registry and Clearance Blank" for a commercial air port issued in the world

Pan-American Aeronautic Convention assembled in memorial meeting, in the Presence of Almighty God, wish most solven and devotion of those who gave their lives, through military aviation, for the purchase of our freedom."

The National Anthem was sung by B. F. Butts, and Miss Evelyn Tyson acted as accompanist, Dr. Howlett of the First Baptist Church pronounced the Ilendeticion.

Thousands of Engineers to Attend Convention

Thousands of Engineers to Attend Convention
Mr. Alan R. Hawley, President of the Aero Club of America and Chairman of the Pan-American Aeronautic Federation, received the following telegram today:
"Mr. Alan R. Hawley, Chairman Pan-American Aeronautic Federation, Horel Challonte, Atlantic City, N. J.:
"Engineers' Club, Philadelphia, and affiliations three houses and strong, extend congrationions successful images, the said strong, extend congrationions successful images, the selected as Engineers' Day, your Committee requesting all Engineering Societies of America which have been invited to the Convention to be present on that date. Our Committee on Arrangements will see you next Tuesday afternoon, Air Port Field. (Signed) Lewis H. Kenney and Joseph A. It is expected that on that date not less than ten thousand.

It is expected that on that date not less than ten thousand engineers will be present and some startling developments in

aeronautic engineering will be made public.

Insurance Policies Issued

Beginning Tuesday, May 5, every person that makes a flight at Atlantic City Airport carries a \$5,000 insurance policy with

his or her flight ticket.

The Managing Editor of Aerial Age was presented by the Aero Club of America with one of the first policies issued. Mr. Alan R. Hawley, the president of the club, in presenting it at the regular meeting of the Convention, expressed the appreciation of the Aero Club of America, the Aerial League of America, and the forty affiliated organizations for the splendid support given to the progress of aeronautics by AERIAL AGE.

AEBIAL AGE.

This most important development in popularizing aeronautics has come as a result of requests made two months ago by the Aero Ciub of America and the Aerial League of America to the Insurance Companies to send experts to the Second Para-American Aeronautic Convention to discuss the subject; and supplying these experts with facts regarding the comparative safety of avidation and air travel.

This development which was hailed with greatest interest

Into development which was naised with greatest interestand satisfaction by the hundreds of people assembled here for the Convention was chrystallized today by the arrival of Messrs. Charles H. Payue and J. W. Richardson, representatives of the Travelers Insurance Company with the Company's newly issued "Aviation Accident Ticket Policies", crisp pany s newly assued "Aviation Accident Ticket Policies", crisp and new from the presses, providing for insurance for avia-tors and passenger. Tet the book led of the properties of the transparence of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-perties of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-teed of the properties of the properties of the pro-perties of the properties of the properties of the pro-teed of the properties of the properties of the properties of the pro-teed of the properties of the properties of the properties of the pro-teed of the properties of the properties of the properties of the pro-teed of the properties of the properties of the properties of the properties of the pro-perties of the properties o

First Aerial Police Arrest

New York's Aerial Poin forces or contrating with the shore authorities, made the first arginate "nerd", very recorded as one of the features of "Aerial Police Day" staged here on the program of the second Pan-American Aeronautical Convention. The "arrest" was but one of the many demonstrations of the practicability of cloud cops as a recognized departicular or the program of the

sums or me practicability of cloud cops as a recognized depart-ment of the police force of modern cities. Fifteen members of the New York air force, who made their first public appearance in their sky blue uniforms, put the program through before representatives of leading cities of the east, making a big hit with their work and incidently giving the Atlantic City Air Port the honor of being the first "Readquarters" in action in makine an across.

giving the Atlantic City Air Port the honor of being the first "headquarters" in action in making an actual arrest.

Sheriff Alfred Perkins, of Atlantic County, drove to the aviation field in his automobile and left it parked near the end of the grandstand. While he was chatting with Eddie the substance of the substance of the substance with Lodge of the substance of the substanc

Seizing a small Ors parachute, which had been used during the past several days to demonstrate mail bag "smashing" without the necessity of a stop, Sheriff Perkins leaped aboard the Stinson aroplane. About this time Deputy Chief S. Herbert Mapes, of the cloud force "recognized" Black as a "notorious New York Motor bandit" as the "thief" shot past the grandstand. Capt. Horace Keane, of the air division, was circling overhead in Aviator Stehlin's 'plane, and Major was circling overnead in Aviator Steinin's plane, and Major Mapes, operating a wireless telephone from "headquarters", shot instructions to him that the man in the automobile was "badly wanted in New York". Capt. Keane wheeled about and set sail for the mainland just as Sheriff Perkins, aboard Stinson's machine left the ground, and they took up the pursuit together.

sufficiently accoplanes beat the motor car to Pleasantive wife where the Sheriff dropped a message via the paracture to a traffic officer on the Shore Road over which all motor traffic must pass to get anywhere on the mainland. The policeman intercepted the speeding "thief" as he approached the crossing and placed him under arrest.

Capt. Keane descended in a field nearby and lodged a de-tainer with Sheriff Perkins, who had also alighted, and the two walked over to the "prisoner". County Detective Harry Fulmer "happened along" about that time and the "thief"



Capt. Hugh L. Willoughhy, one of the American aeronautic pineers, is keenly interested in all the happenings at the Conventie

was turned over to him to bring back to the field. Black, was turied over to finit of oring tack to the field. Dack, handcuffed to Fulmer, was back in front of the grandstand eleven minutes after he had "stolen" the car and the first official aerial arrest was recorded at airport "headquarters".

A short time later Maj. Granville A. Pollock, wing com-

A short time later Maj. Granville A. Pollock, wing commander of the police squadron, demonstrated an "arrest" with a scaplane capturing a motorboat "pirate" in the waterway that forms a part of the airport. The air cops later showed just how they will police "beats" established in the air, putting on a simulated wireless conversation with an express train conductor dashing across the meadows to show how trains could be intercepted between cities in case of an emergency or in getting quick aid to wrecks.

Aerial Shooting Contests

Following a conference held at the Atlantic City Municipal Following a conserence rich at the Atlantic City Municipal Aliport, in which axes and prominent aeronautic authorities of nine countries participated, and at which ways and means of maintaining efficiency in shooting from aircraft were discussed, the Aerial League of America offered a trophy to be competed for animally to be known as the "International Aerial Shooting Trophy", and another trophy, to be known as the "National Aerial Shooting Trophy".

In these contests the gunner will go up in an aeroplane and occupy the position of the observer. The gun is mounted on upwards and sidewards; but not downward. The gunner will have ten shots and will have to try to bring down ten small free balloons painted like birds. The gunner will have to try to bring down ten small free balloons, painted like birds. The gunner fires at the ballons, one by one. The instant the ballon is hit, it explodes and fails. The judges watch the contest and note the

time required to bring down the ten balloons in each case. The best time made in bringing down the ten balloons will establish the championship. establish the championship establish the championship establish the champions of the disk said: "This tournament is to be a most valuable factor in maintaining shooting efficiency and will, therefore, be of immost importance for attornate them, which is the control of the champions of the disk said: The storm of the champion of the disk said: This tournament is to be a most valuable factor in maintaining shooting efficiency and will, therefore, be of immost importance for attornation that the champion of the champion of

thousands of marksmen and inbooting experts who have not yet taken up aviation. It will be a great thing for both the nation and the individual." Experts who discussed the serial file acceptate who discussed the serial file acceptate the file of the file acceptate who discussed the serial file acceptate f

Mont Thompson, in charge of the Aviation Section, New York Police; Major S. Herbert Mapes, Captain Pierre Edgar Bose, member of the French High Commission; Lieux Commander Dons, Naval Attaclie, Norwecian Legation; Capt. F. C. Scjorstere, Swedish Legation; Engineer-Commander K. Kitshima, Imperial Japanese Navy: Rear Admiral W. N. Little, U. S. Navy (retired); Capt. C. Bernsson, Military sentative of Cohi; General Pilina, Representative of Chili; Lieut. Edgar Henry Garland, Royal British Air Force; Capt. G. Lemstrand, Royal British Air Force; Leut. Santiage Computano, French Air Service; Mr. Alan R. Hawley, President Aero Club of America, Mr. A. T. Bell, President Aero Club of America, St. A. T. Bell, President of Admirch Acro Club of America, St. A. T. Bell, President of Computano, French Air Service; Mr. Alan R. Hawley, President Aero Club of America, St. A. T. Bell, President of Admirch Colone, St. Schotter, Mr. Alan R. Hawley, President Aero Club of America, St. Secretary Aerial League of America; Captain Hugh L. Willoughby, Mr. Fred Wagner, W. W. Young, the noted engineer; Ensign H. D. Enger, U. W. Young, the noted engineer; Ensign H. D. Enger, U. Earl S. Ovington, Edward Slinion, the famous aviator. The plan was first suggested by Major Thomas S. Baldwin, U. S. A.

DAILY PROGRAM FOR PAN-AMERICAN AERONAUTIC CONVENTION, EXHIBITION AND CONTESTS

SATURDAY, MAY 10TH

AFTERNOOM-Army, Navy and Marine Corps Day. Acrial contests and tournament.

EVNING—United States Army and Navy Officers' Reception. Reception and addresses at Aeronautic Exhibition Hall of the Steel Pier.

SUNDAY, MAY 11TH

SUNDAY, MAY DESIGNATION OF THE STATE OF THE THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF

MONDAY, MAY 12TH

AFTERNOON.Demonstrations and illustrated addresses on the "Value of Aircraft for Advertising by Day and by Night." All EVER addresses and advertising against sortied in altend.

EVER advertisers and advertising against sortied in altend.

By members of the commissions of the 20 Latin-American Republics.

TUESDAY, MAY 13TH

AFTERNON AND EVENING—"Pan-American Acrial Transport Over Water." Addresses by members of the 20 Latin-American Republics' Commissions.

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH AFTERNOONS AND EVENINGS-"The Airways and Aerial Transport in Europe, Canada, Atrica, Australia and Asia."

FRIDAY, MAY 16TH

AFTERNOON AND EVENING—"Acrial Navigation Instruments for Flying Over Land and Water." Aviators, navigators, scientific instrument makers and acronautic experts invited

SATURDAY, MAY 17TH

AFTERNOON-Aerial races and contests. Illustrated addresses on Aerial Photography.
EVENING. Ball.

SUNDAY, MAY 18TH

AFTERNOON AND EVENING-Illustrated addresses on "Aerial Ex-ploration and the Use of Aircraft for Coast and Geodetic

MONDAY, MAY 19TH

MUNUAT, MAY 191H
AFTERNOON-Addresses on "Need of Broader Attitude Regarding
Insurance for Aircraft and Aviators."
EVENING-Illustrated address on "How Army Medical Standards
and Inspection Lessen Accidents." Insurance companies and

TUESDAY, MAY 20TH

AFTERNOON AND EVENING-Illustrated addresses showing differ-ent ways of crossing Atlantic by air and the problems to be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST

WEJUKEJUAT, MAI ZIDI AFTERNOON-Arro Safety Day. Discussion of acro safety pravisions made; improvements in aeroplane construction; increased re-liability of aero motors; devises which make for safety in flying. EVENING—"Progress Made in the Art of Piloting Aeroplanes." films-trated.

THURSDAY, MAY 22ND

FRIDAY, MAY 23RD

AFTERNOON AND EVENING-Addresses on "Aerial Jurisprudence-Aerial Lawa and Regulations of Air Traffic." (First day). Lawyers, traffic commissioners and police authorities of differ-ent countries invited.

SATURDAY, MAY 24TH

AFTERNOON-Races and contents.

EVENING-Illustrated address on "Need of Establishing Altitude
Levels for International, Interstate and Interurban Air Travel."

SUNDAY, MAY 25TH

EVENING-Acronautie Art Day. Address on "Aerial Painting an Sculpture of Different Countries, and Exhibition of Aerial Paint ings," by Lieut. Farre, Lieut. Ruttan and others. All promisens artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK

MONDAY, MAY 26TH

EVENING—"Aeronautic Engineering Problems and Their Prospective Solution." Opening of contests for designs and ideas for large

TUESDAY, MAY 27TH

EVENING-"Factors That Increase the Efficiency for Large Dirigibles." "Advantages of Veneer and Plywood for Aircraft Conatruction.

WEDNESDAY, MAY 28TH

AFTERNOON-Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective Solution."

EVENING-"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON-"Flying Boats Versus Hydroseroplanes for Sport and Transportation."

EVENING-Contest for designs and ideas for large aeroplanes.

FRIDAY, MAY 30TH (Memorial Day)

AFTERNOON-Aircraft contests. EVENING-Reception at the Aeronautic Hall, Steel Pier.

SATURDAY, MAY 31ST

AFTERNOON-Aircroft contests.

EVENING—"International Medical Standards for Aviators in War
and Peace." Reports from different countries illustrated with
attractive films. 30,000 medical men invited.

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING-Award of prizes and diplomas for all

THE SIDDELEY-DEASY "PUMA" AERO ENGINE

This design of the Puma engine was started in January, 1917, and the first experimental model was completed in the following March. By the end of the autumn the engine was being produced on a quantity basis, and by the signing of the Armistice more than 625 engines had been delivered, in addition to a vast number of spare parts.

delivered, in addition to a vast number of spare parts. This engine, designed and manufactured by the Siddeley-Deary Motor-Car Company, Limited, of Coventry, is of six and 190 mm, giving a total cylinder capacity of 188 liters. The two outstanding features of this engine are the construction of the cylinders and the arrangement of the mechanism actuating the valves; these features not only give this power unit a decidedly distinctive and handsome appearance, but greatly facilitate the dismantling and crection of the cylinder or any such repairs as are filedly to lecome necessary, and tripled the comparatively simple matter even by mechanics possessing no very great skill or experience.

The cylindres consist of a thin steel liner, forming the working barrel, which is mounted in an aluminium casting forming the cylinder heads, water jackets, valve passages, and indet manifold; these aluminium jackets are cast in two separate units, each of which contains here cylinders. Near in a horizontal plane, into two portions, the joint being made by a number of bolts; leakage of water at the lase of the aluminium jacket is entirely prevented by a rubber ring which is pressed against a shoulder on the steel liner by the castragement of these cylinders is shown in Fig. 1, general arrangement of these cylinders is shown in Fig. 1, general arrangement of these cylinders is shown in Fig. 1, general arrangement of these cylinders is shown in Fig. 1.

rangement of these cylinders is shown in Fig. 1. The cooling water is introduced at the top of the rearmout. The cooling water is introduced at the top of the rearmout cylinder heads and valve passages by an aluminium pipe running through the whole of the blocks of the cylinders; the water ultimately makes its escape near the top of the foremost cylinder jacket. The cooling of the lower portions of the cylinders is effected by convection, and by turbused to the cylinder barrels are produced to the cylinder barrels and the convection, and by turbused to the cylinder barrels are produced to the cylinder barrels and the colling of the water through the

The valve seatings are not cut directly upon the aluminium heads of the cylinders, but upon bronze rings which are excended into the aluminium

neads of the cynners, but upon bronze rings which are expanded into the aluminium.

The heads of the cylinders are flat, and each carries one
the cylinders are flat, and each carries one
the cylinders which are flat and the cylinders which are for the cylinders
where are of tungeter steel, and each is held against its
seating by a single volute spring; the inlet valves are of nickel
steel, and each is provided with two telescopic helical springs. Adjustment of the valve clearance may be rapidly effected by means of a large diameter cap which serews on to the stem of each valve. The operating mechanism of the valves is unusual;

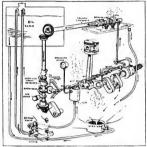


Fig. 2-Showing oil circulation of Siddeley-Deasy "Puma"

the camshaft is carried immediately above the exhaust valves, nothing lexyond the aforementioned adjustable cap being interposed between these valves and their respective cams; the inlet valves are each operated through the agency or a small rocking lever, whose fulcrum is supported from the top of the camshaft housing.

The camshaft is carried in four large bearings carried in the camshaft housing; this housing is lost in aluminium, and is well provided with inspection doors, two of which are arranged upon each side of the engine; the whole of the valves and their gear are enclosed and their complete protection from the weather assured.

The pistons are die-cast from an aluminium alloy, and each carries three cast-iron rings near the head and a scraper ring



Fig. 3-Side view of Siddeley-Deasy "Puma"



Fig. 4-Three-quarter view of the "Puma"

lelow the gudgeon-pin; the two grooves, whose sides are chamfered, are provided—one immediately below the lowest gas ring, and the other immediately below the scraper ring in order to remove any surphysio il from the cylinder wall, this oil escaping into the crankcase through a row of small holes drilled in the bottoms of each of the two grooves. The hollow gudgeon-pin is made a floating fit in the giston bosses, of "e"-shaped springs fitting into annular recesses cut in the piston bosses; the gudgeon-pin also floats in the little-end bush, which, in turn, floats in the connecting rod.

whiten, in turn, moats in the connecting rod.

The connecting rods are machined all over from hightensile steel, and are of H section. The big-end bearing cap registers into the rod and is held in position by four bolts; rotation of the white-metal lined bronze bush is prevented by a dowel pin.

The emulahat is of the conventional six cylinder seven bearing type with the cranks spaced 20 degrees apart; both the crankspins and the journals are hollow, and in order to permit of internal circulation of oil the ends of both journals and pins are closed by two dished steel caps drawn together by a central both. The threst bearing is strated some considerable distance from the foremost journal bearing, and for ward end of the crankcase as an additional support for the shaft; beyond this roller bearing the shaft is serrated in order to receive the airserve coupling. Serewed on to the rear end of the crankcase are objectively pinion through which the cambatal and the whole of the engine accessories.

The arrangement of the journal bearings is in accordance

with the more usual six-cylinder practice. The upper lalves of the intermediate bearings are carried in the upper half of the intermediate bearings are carried in the upper half bolts, which also serve to hold the cylinders to the crank chamber. These bearing caps are of aluminium and are stiffened by steek keep-plates of channel section. The lower half to the control of the con

drical well into which is fitted a filter for the oil; this filter is capable of being withdrawn from the outside of the engine. The lubricating system of the engine is diagrammatically illustrated in Fig. 2. Driven by a vertical shaft, which operates the whole of the accessories, are two oil pumps of the gear type. The upper of these two pumps draws oil from an external tank and forces it through a filter carried on the off side of the engine and into a manifold of steel tube which runs through the whole length of the crankcase. Leading from this manifold are several branch pipes which supply oil to each of the journal bearings, the thrust housing, the bearings of the vertical shaft, the bevel wheels driving this shaft, and to the skew gearing operating the magnetos. The oil fed to the main crankshaft bearings passes into the hollow journals and by way of holes drilled in the crankwebs to the crankpins; oil is flung off the crank pins on to the cylinder walls and the little ends of the connecting-rods. Branching from the front end of the manifold is a pipe of constricted bore, through which oil is fed to the hollow camshaft. Some of this oil is thrown out through radial holes on to the camshaft bearings; after exuding from these bearings, it is flung on to the cams, rocking-levers and valve heads; the oil then collects in the bottom of the camshaft housing and is ultimately conveyed therefrom to the crankcase by way of two pipes. Such oil as is not thrown out continues to travel along pipes. Such oil as is not thrown out continues to travel along through the canishaft, out of whose rear end it falls on to the upper pair of bevel wheels, and into the casting enclosing the vertical shaft, and eventually into the strainer in the base of the crank chamber. The oil which collects in the base of the chamber is drawn out by a second pump and forced back to the oil tank, from which it again circulates through the engine. As this second pump is of considerably larger capacity than the first, it follows that the sump is always free of liquid oil and excessive lubrication of the cylinders, due to oil splashed by the big-ends, is entirely prevented.

vented.

Two independent sparking pluts are fitted in each sylinder.

Ignition may be carried out by two high-tention magnetotention may be carried out by two high-tention magnetoplated by the control of the region of the

battery, inrough a Kemy commined contact-peaker and of a tributor mounted at the rear end of the camshaft housing, and a coil carried on the other magneto platform. The general layout of the engine is very well shown in the accompanying illustrations (Figs. 3 and 4). It will be (Continued on page 453)



Fig. 1-Siddeley-Deasy cylinder for "Puma" type engine

THE BRITISH ENTRIES IN THE TRANS-ATLANTIC RACE

As interest centres more and more in this race, a few words dealing with the British machines entered will, we feel sure, be welcomed by our readers. From "Flight!" we are able to give details of the machines entered to date.

Machines	H.P.	Speed	Pilot
Martinsyde .	. 285	100	Mr. F. Raynham
Fairey	. 375	120	Mr. S. Pickles
Short	. 350	95	Maj. J. C. P. Wood
Sopwith	. 350	100	Mr. H. G. Hawker
Sopwith Whitehead .	.1600	115	Capt. A. Payzo
Seaplane	. 440		Capt. H. Sundsted!

The Sopwith Machine

The Rolls-Royce engined Sopwith transport type specially designed for an attempt to win the Daily Mail Prize for crossing the Atlantic, is of the vertical biplane type, the wings having no stagger. Pilot give a large specia in the fuselage between them and the engine, in which to fit the large perfort lark required for the great amount of fuel that has to be carried for a flight of fluid union. This hank has a flight of fluid union. The hank has a contain 24 gallons, and the water reservoir 17 gallons. The weight of the mad-

chine empty is 3,000 lbs., and fully loaded she weight 5,150 lbs. The accompanying general arrangement drawings will give a good idea of the dimensions of the machine. The engine fitted is a Kolls-Royce "Eagle" of 375 h.p., which will give the Tagle" of 375 h.p., which will give the Tagle of 375 h.p., which will give the transport of the standard and the way, the most economical speed from the point of fuel consumption lying somewhere between the maximum and the minimum paed, and varying with stime of the standard stand

The cockpit of the occupants is arranged in a somewhat unusual way, the two seats being side by side, but somewhat stagered in relation to one another. The object of this seating arrangement is to mable them to communicate with one another more readily and to facilitate or the seating arrangement is only to the seating arrangement is only to the seating arrangement is other more readily and to facilitate only. The very deep turtle back of the fuselage is made in part detachable, the portion which is strapped on being built so as to form a small lifeboat in case of a forced descent on the sea. In this manner it is hoped to provide sufficient floation massing vessel may pict them us, should

a descent be necessary. As the machine is not fitted with floats, it would, of course, be out of the question to get her off again once she was in the water. In other respects the machine does not differ greatly from standard Sopwith practice.

The Short Machine

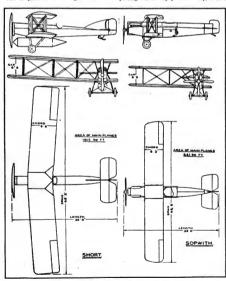
Fundamentally the Short machine entered for the race does not differ greatly from their standard torpedo carrier known as the "Shirl." It is, as will be seen from the general arrangement draw-leaves to the standard shirl in the place between the chasis strusts usually occupied by the torpedo in the standard "Shirl" is slung a large cylindrical fuel tank which, should the necessity arise, can be quickly empired so as standard "Shirl" is slung a large cylindrical fuel tank which, should the necessity arise, can be quickly empired so as keep the machine afloat for a considerable period. In order to be able to carry the extra weight of fuel necessary for the long journey larger wings have been long journey larger wings have been long journey larger wings have been cach side instead of the two pairs fired on the standard machine. A feature which is unique for this machine is the weepback of the planes, which is very pronounced. This should form a very pronounced. This should form a very pronounced. This should form a very pronounced. This should from the fact that up to the present she is the only machine entered on which the westward flight will be attempted, she can scarcely be confused with any of the other

As in the case of the Sopwith machine, the Short is fitted with a ROIL-Boxee "Eagle," and the fuel canacity is sufficient for a flight of 3,200 miles; in still air, of course. As the distance across is a little under 2,000 miles, this leaves a fair moder 2,000 miles, this leaves a fair the prevailing winds in this part of the Atlantic being waterly at this time of the year. It will, therefore, be seen that the decision to make the westward flight may not be so dangerous as many are apt to magnine, and certainly considerable time shipping the machine across before a start can be made.

The cockpits are arranged in the usual fashion in this machine, i. e., in tandem. A directional wireless, set will be fitted as well as all the navigation instruments of the usual type. The maximum speed is expected to be about 95 mp,h., but the set of the considerably lower. The property of the considerably lower.

The Martinavde Machine

The machine entered by Messrs. Martingde, Ltd., is more or less of standard Martinsyde type, with the occupants of the property of the propert



Scale planes of the Short and Sopwith Trans-Atlantic Aeroplanes

THE PRINCIPLES OF AEROPLANE DESIGN

WHITE LEADING WAY & BELLEVILLE.

By CAPTAIN JAMES VERNON MARTIN

INTRODUCTION Primary Divisions

The guiding principles of aeroplane design are neither unumerous nor difficult of comprehension, but their thorough-going application involves the most painstaking laboratorial and flight tests and the replete use of higher neithernetics.

Primarily the problem of the aeroplane is one of wind resistance, and secondarily of internal structure. This gives rise to the first division:—the external or aerodynamic, and the internal or structural assoct of the aeroplane.

It will be noted that the members of this division are relatively independent of each other; this means they form the basis for the study of special problems unconditioned by problems in the opposite division; for instance, the aerodynamic aspect deals with only the form and area of the parts of an aeroplane exposed to the air, while the structural problems, limited to the dimensions and stresses aerodynamically determined, may be pursued without further reference to air resistances. In other words, it is a matter of indifference aerodynamically what structure or safety factors are em-

ployed within the external skin for an aeroplane, and of equal indifference structurally what aerodynamic characteristics the acroplane may have. As a consequence we find planes in which the structural engineer has trussed his stresses so ingeniously that a large percentage of the total weight is represented by useful load, but the total load carried will vary directly with the aerodynamic properties of the plane or, more specifically, with the lift/drift ratio and the horsepower employed; thus the plane may be very good structurally and poor aerodynamically, or vice versa.

I do not hesitate to emphasize the importance of rendering these primary divisions clear and distinct in order to avoid serious confusion, and in order to assist the student of aviation in electing to which sub-division he should devote his

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Of one thing I feel certain, that there will be found no other word so universally applicable to the successful achievements of the aeroplane engineer as the word "compromise," for my own experience teaches that while we have clearly defined ideals, we must always remain at a respectful distance from

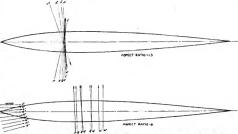


Plate 1—Sections of U. S. Aerofoil, M. I. Showing position and direction of lines of resultant air force



Plate 3-Perspective of Tractor Biplane indicating position of cutex

them because of practical inhibitions. As a working example of this conflict between the aerodynamic ideal and the practically attainable. let us consider the recent attempts to design and build what may be termed the perfect aeroplane, one having only useful or aerofoil re-sistance. Such an aeroplane is obtained by selecting an aerofoil of comparatively deep cambre and increasing the cord until the resulting wing section is deep enough to completely house motor, man, fuel, chassis and useful load. Thus in the drawing, Plates 1 and 2, we have an aerofoil U. S. M. I. which with a standard aspect ratio compares most favorably in efficiency with other aerofoils, and is of near-ly double cambre; it also has a relatively slight center of pressure movement throughout flying angles, and is particularly well adapted for the requirements of this problem in possessing zero lift at zero in-

SECOND PAN-AMERICAN AERONAUTIC CONVENTION AND EXHIBITION

To Be Held Under the Auspices of The Aero Club of America. The Aerial League of America and the Pan-American Aeronautic Federation.

> From Thursday, May 1st, 1919, June 1st, inclusive. Atlantic City, N. J.

Intercollegiate Contests Throughout the Summer CONTESTS TO BE HELD EACH SATURDAY

- (1) Seaplane Contests (general),
- (2) Curtiss Marine Flying Trophy and Prizes.
- (3) Intercollegiate Seaplane Contests.
- (4) Land Aeroplane Contests,
- (5) Dirigible Contests.
- (6) Kite Balloon Speed in Ascending and Descending, and Maneuvering Contests,
- (7) Parachute Competition.
- (8) Aviette (bicycles and motorcycles with wings) Contests.

EVERY DAY ACTIVITIES

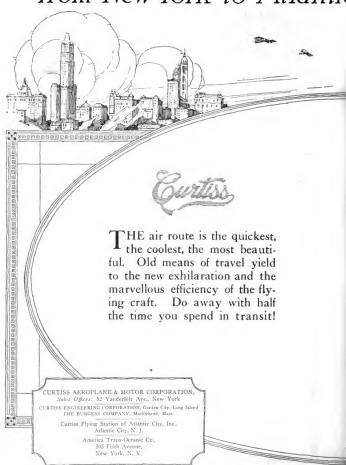
- (1) Exhibits of Aeroplanes, Motors and Accessories on the Steel Pier.
- (2) Demonstrations and tests of Seaplanes, Land Aeroplanes, Motors, Dirigibles, Kite Balloons, to prospective purchasers and representatives of different gov-
- (3) Aerial Passenger Carrying by seaplanes and dirigibles, and kite balloon ascensions.
- (4) Moving pictures and Addresses by leading authorities on most important phases of aeronautics.
- (5) Competition for the Pulitzer Trophy.
- (6) Competition for the Atlanta Journal Trophy.
- (7) Competition for the Curtiss Marine Flying Trophy.

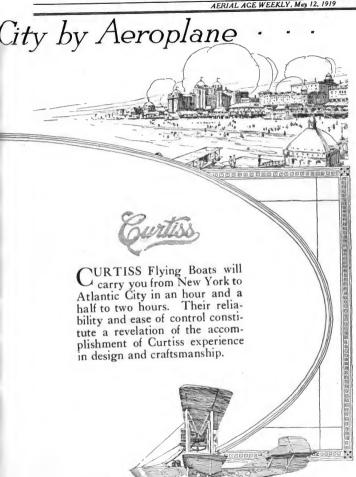
The Governments and Aeronaulic, Sporting, Scientific, Industrial and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are invited to send representatives to attend this great aeronaulic event. On arrival in the United States these representatives should call at the Headquarters of the Convention Committee at No. 259 Madison Aeronau, New Port City, to repiter and receive their afficial docts and the official program. For the Convention Constitution of the Convention Constitution of the Aeronaulic Convention Located at the following Atlantic City hotels: Hotal Traymort Hotal Challens, Hotal Adamse, Hotal Dennis and Hotal Hoddon Hall.

Representatives of the Convention Conmittee will be at the Bureaus of the Aeronaulic Convention at the above-named hotels and will issue the official badges which admit the beaver to the Aeronaulic Alla, as well as the Aero Exhibition on the Steel Fire, the judge enclosure during contests, and to the Aerodrome and scapton where the aeronal of memory and the documentaries.

All communications until May 1st should be addressed to Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City. Entries for the contests should be addressed to the Contest Committee, Hotel Chalfonte, Atlantic City, N. J.

From New York to Atlantic









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cidence which avoids longitudinal stability problems due to enormous speed.

But having overcome all the special problems involved, and after having evolved an internally trussed wing of great strength, is the job when complete as efficient aerodynamically as the best job of the imperfect type? I answer, No, not final job, its total lit/drift ratio shows less value than certain standard tractor biplane types. The race for efficiency highest possible lift/drift ratio, let us return to the problem as to which type of aeroplane promises the highest ratio. The highest ratio obtainable, judging from data so far available, is from an aerofoll having an aspect ratio of ten and a form of wing end similar to that shown in Plate 4, and our problem is, what departures from this ideal will involve the least lift/drift reduction?

Suppose we attempt to obtain a good aspect ratio, say 6 (See Plate 4), then if we are to avoid external trussing, as

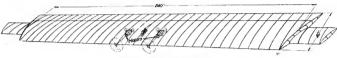


Plate 4-The perfect aeroplane

is very close and while the best conventional type has many practical advantages over the perfect or wing type, I shall certainly not be so dogmatic as to deny the future possibility of adapting the wing type successfully in these respects. It is a more fundamental compromise which leads me to hope for the continued supremacy of the tractor biplane, namely, the effect of aspect ratio and the plan form of an aerofoil upon the lift/drift ratio.

up of the state of

drift, (b).

the terming to Plate A, the drift (fx) of an aeroplane represerve the air resistance which must be overcome by lorsepower expended in the throw in order to develop the lift (L) which represents the total load which can be sustained at a given speed. Thus it will be observed how direct an index to an aeroplane's aerodynamic efficiency we have in the total lift/drift ratio, and it follows that of two aeroplanes having equal safety factors and proportion of useful to total load that one having the greater lift/drift, ratio will be the more efficient and practically useful.

One example of the effect of a difference in titl/drift ratio in aeroplanes otherwise similar will be found by comparing a tractor hiplane having a litt/drift of eight with one of ten on a flight to 400 miles. Supposing the machine with extent of the ten of the te

by supposition of the prefect aerophus we must, we will find the distribution of our loads necessary. This could be attained by disposing our motors chassis and man, as represented in the sketch. The dimensions of this carle would be at least 40 feet in cord and 240 feet in span in order to afford a vertical dimension of 4 feet within the aeroid skin at the greatest cambre. The many practical difficulties of this dependence of the control of the state of the control of the control

"This study of the perfect type aeroplane leads us to conpare the relative nerits of the modified wing type Ilsta 2, having a low aspect ratio and the conventional tractor biplane. The issue is, whether the loss in litt/drif ratio, due to diminished aspect ratio, is greater than the loss due to diminished aspect ratio, is greater than the loss due to diminished aspect ratio, is greater than the loss due to diminished aspect ratio, is greater than the loss due to the advantage of the loss of the loss due to the loss which seems necessary in the modified wing type aeroplane of low aspect ratio, namely, that requirement (Compare viete 2 and that which has leen found most efficient. When every care has been exercised to obtain the best ordinates for a deep cambre wing (here also there is a loss, probably 10 per cent, over less cambred section), we find both by ackendation and by which tunnel test that it is difficult to secure Plate (a).

The next consideration is: to what minimum can structural resistance in the conventional type be reduced in order to compete with the above figure. It may be interesting to note that the lift/drift ratio on the average Naval and Military plane, as at present constructed, varies from a low mark

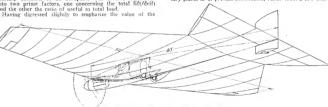


Plate 2-Perspective of wing type aeroplane

We next meet the problem of providing a truss for the wines which will distribute the weight of the fusdage, centrally located, to the wings with a uniform safety factor; proportionate that a wholly enclosed cantelever truss becomes impractical (I do not say impossible, for at great sacrifice of the useful load, and using a very thick wing, the content of the sacrifice of the useful load, and using a very thick wing, the content truss, i.e. one having the least projected area and trussing the stresses at natural concentrated points of advantage. Here again we meet the forks in the road, and must choose between the monoplane and argument of supervasa the consensus of opinion among aeroplane constructors that the cellule truss, with its interference, must always remain at a disadvantage to the monoplane, but the advent could attain more speed than the simplest trussed monoplane of the same horse power and that at speeds of 100 mp.h. and over, the comparative simplicity of the biphane transing and over, the comparative simplicity of the biphane transing terference. The reason for this will be more readily comprehended when we understand that a portion of the interference on the ouper surface of a wing is roughly three times as detrimental as a proportionate disturbance on the lower a trust upon both upper and lower plane and that the interference con the upper surface of a wing is roughly three times as detrimental as a proportionate disturbance on the lower a trust specific part of the properties of the single lift truss biplane cellule and alpo has some interference.

certain and set and account in the concepted area and interference of the highan cellule be reduced? A very simple computation will show that the conventional one-to-one gap-tocord ratio is about the best obtainable with the double truscellule commonly in use, the reason for this being that the increase of structural resistance and weight in struts and

J.V. Martin

Amrafall Mt

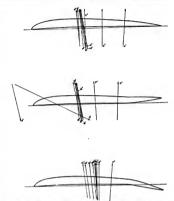


Plate 5—Sections of Aerofoil R. A. F. 6 showing movement of centre of pressure caused by flexing the trailing edge

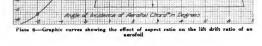
wires due to using greater gap than cord more than offsets the slight reduction of the interference due to separating the superposed wings; neither is there any total advantage in staggering the planes relative to each other.

superposed wings; heinfer is there any total advantage in Since the intercellule strust and wires constitute the undesirable structural resistance and also cause a considerable percentage of the interference, it follows that the most direct percentage of the interference, it follows that the most direct wind resistance. The last mentioned was the first means to be employed, anneby, forming struts and wires so as to give them streamline form. The size of the members is more or less definitely determined by the stresses applied so that a few seeds and the structure of the structu

An impection of Plate 5, Fig. 1 will show the position of the center of pressure or life on a standard acrofioli for normal flying angles. Our problem is truss this force directly and simply throughout its normal movement and to care for the displacements due to abnormal that if we can meet the above requirements we gain in four distinct ways:

stead of a double cellule truss.

- A direct reduction of structural resistance due to elimination of parts.
- A reduction in weight due to the concentration of stress in one rather than in several members,
- A reduction of the interference due to partial elimination of struts and wires.
- A reduction of interference due to increased gap/chord ratio which the single truss permits.
 (To be Concluded)



Carves of Contract 40 M.P.H.

a - Aspect Ratio 60

4 - Aspect Ratio 13

6

THE MANUFACTURE AND USE OF GLUES IN AEROPLANE CONSTRUCTION

By B. C. BOULTON, B. S., A. E.

PART II.

(Continued from page 396)

Mixing of Casein Glue: To obtain satisfactory results with casein glue it is of extreme importance that the glue be prop-erly mixed and applied. The directions issued by the best manufacturers with each brand of glue can be relied upon, and should be carefully followed.

snoun to exercity rollwee.

Thorough mixing before use of the contents of a freshly opened barrel of prepared glue is advisable in all cases, because in shipment the heavier ingredients of the glue tend to separate out. The contents of the barrel, or barrels, are emptied into a box of suitable size and turned over with a clean shovel until the mass is uniform throughout.

Rapid stirring during the first few minutes of mixing is

For this reason the slow machines used for mixing animal glues are unsatisfactory. The best type is a vertical, compound gues are unsatusfactory. The teat type is a vertical, compound movement power mixer of variable speed, similar to the cake variable speed, similar to the cake in a relatively small, detachable kerlte that he eastly removed and cleaned. The small size of the kettle makes it possible to mix up no more than will be used before the glue hardens to that it cannot be spread. Except for larger work, the glue so that it cannot be spread. Except for larger work, the glue should be furnished the men in one-pint, enameled iron cups. Copper, brass, or aluminum vessels should not be used for mixing caseing glues, as the alkali in the glues attacks these metals. To prevent spattering of the glue outside the mixing kettle a metal hood, fitted with a feed hopper, will be found effective

Since, with very slight modifications, the procedure used in mixing Certus glue can be adapted to other casein glues it will be given here. The requisite amounts of water and glue, which are in the proportion of 18 parts by weight of water to which are in the proportion of to parts of sugar to the log parts of glue, are carefully weighed out in separate containers. Owing to slight variations in the dry glue, this proportion may have to be altered slightly to give a glue of uni-form consistency. The water is poured in the mixing kettle; the machine speeded up to about 350-450 r.p.m. of the blade, the machine speeded up to about 350-450 r.p.m. of the blade, which for most mixers corresponds to about 140 r.p.m. of the vertical shaft; and the glue gradually introduced through the hopper. The other importance of the state of the state of the hopper of the state of the state of the state of the state of the last of the glue has been added. The mixer is then stopped to permit the scraping down of any glue that may have synatered on the sides of the kettle. When this has been done the ma-chine is again ast in motion, but at a slower speed (60-90 r.p.m.) of the shaft) and the mixing kept up for at least ten minutes, or until all the fine particles of casein are dissolved. The puror until all the hue particles of casen are dissolved. The pur-pose of the reduction in speed during this second mixing is proposed to the reduction of the proposed to the pro-into the glue. Should there still be an appreciable amount of air in the glue it is advisable to permit the mixture to stand a short time before using, so that the air can separate. Some casein glues require the addition of various ingredients singly, and it is necessary to change the above practice to conform to the manufacturer's directions,

On important work it is best not to make any changes in the consistency of the glue. But if the mixer is familiar with the nature of the glue being used, it is permissible to alter its consistency before the glue has been removed from the mix-ing kettle. In case the glue is too thick, an extra part or two of water may be added, or if it is too thin a small amount of or water may be added, or it it is too thill a small amount of dry glue may be put in. Stirring at a slow speed should be kept up a few minutes until the water is thoroughly incor-porated in the mixture, or the glue completely dissolved. With a glue in which the different constituents are added separately this method cannot be followed. It is possible, however, to mix up a thick glue and add this to the thin glue, but the practice is not good.

practice is not good.

Application of Carcin Glue: The results of tests show that, at any time during its working life, good results may be obtained from normal glue. In fact, the strength of the glue increases with its viscosity. But once it has become too thick to spread properly the remaining glue must be rejected. The working life of casein glue varies with different brands; Certus is one of the more satisfactory in this respect, as musually it is workable for 4-5 hours after mixing. Liberal application of the glue to all the surface of both faces of the joint gives the best results. Some glue should squeeze out of

the joint when pressure is applied. The clamps should be put on as soon as possible, not more than 10 minutes after the spreading is begun, depending on the kind of wood, the amount of glue used, the temperature, and the glue consistency.

of glue used, the temperature, and the glue consistency. About 159 libs, per sp. in, is a suitable pressure; more than this tends to squeeze the joint dry of glue.

It is a squeeze the joint dry of glue. Lept under pressure is about 3-5 hours, varying with the size of the glued surface. Upon removal from the clamps the wood should be dried to remove the moisture added by the glue, particularly if variable is to be applied. Full strength and water-proofuses are the strength of the strength and water-proofuses are the strength of the strength of the glue and water-id on the measure them. A Avoid lumpy mixtures. A Avoid mixtures which are too thick or too mixture is obtained. O. Do not attempt to use glue after it. thin. 5. Mix until all the fine particles dissolve and a smooth mixture is obtained. 6. Do not attempt to use glue after it has become too thick to spread properly. 7. Never thin or thicken glue once it has left the mixer. 8. Keep all brushes, kettles, and pots sanitary to prevent bacterial infection of the glue.

Factors Affecting the Quality of Casein

The variation in caseins from different sources, or even in The variation in caseins from different sources, or even in successive shipments from the same manufacturer, are often so great as to make necessary changes in standard glue formulae if satisfactory results are to be obtained. Regulation and standardization of the processes used in the production are essential if casten glue is to be made reliable in strength and water-profing qualities.

The Forest Products Laboutory has recently completed ex-

tensive experimental work on this subject. It was found that, for the purpose of controlling the quality of the product, the following properties serve as suitable criteria: color, odor, incness, and moisture, ash, nitrogen and acid content. Their

omeness, and moissure, ash, nitrogen and acid content. Their conclusions may be summarized as follows:

1. Lack of uniformity in commercial casein is due, partly to lack of care in skimming the milk, drying the currd, and grinding the casein, but largely it is due to the different methods used in precipitating the curd and to insufficient wash-

methods used in precipitating the curd and to insulincient wasning of the curd.

2. The fat content should be as low as possible since, though it does not affect the waterproofness of the glue, it decreases its strength in proportion to the amount of fat

3. The acidity should also be kept low because acid affects unfavorably both the strength and waterproofness of a glue, increases the time required to dissolve the glue, and decreases its working life.

4. The fact that ash (mineral salts) is inert matter makes

it undesirable.

5. Casein which will not pass a 60-mesh sieve does not dis-5. Casein with the lowed to stand considerably longer before using than finer casein, and is not of such high

before using than nner casein, and is not or such might strength.

6. To produce casein of low acidity, low ash and high nitrogen contents the curd must be thoroughly washed; with the natural sour method 3 or 4 washings are enough,

with an acid curd cooking is the only safe way.

7. The sole method at present of producing a consistent, low ash content is the so-called ejector process. Further study of acid methods will probably develop means for better

removal of the ash. With care in the manufacture, and proper control of the product by chemical analysis, a uniform, commercial casein can be readily produced at the present time that will conform

to these specifications: Color, white; ash content, 25 per cent (max.) on a moisture free basis.

Odor, sweet; fat content 1.5 per cent (max.) on a moisture free basis.

Fineness, 60 mesh; nitrogen content, 14.5 per cent. (min.) on a moisture, fat, and ash, free basi Moisture, 8 per cent (max); acidity content, 2.5 cc. N/10 alkali per gram (max.) on a moisture free basis.

Teeting of Glue

Two general types of tests have been developed, each type designed to serve a different purpose. The first is primarily

for the glue or aeroplane manufacturer who must have simple, inexpensive, and rapid means of checking up, from day day, the relative quality and uniformity of his product. second is essentially for a well-equipped, experimental laborastorin resistinary for a wear-engined, experimental another forty for the purpose of determining, by more or less elaborate and extended quantitative tests, the suitability of certain glues for specific mess, or of developing and improving new glues. Viscosity, jelly, odor, foam and flusus tests fall under the first head; shear strength and the various deterioration tests come under the second. In doing all testing work it is extremely important that average working conditions be closely followed important that average working conditions of crossly follower in the preparation of the test specimens, for otherwise, no indication is obtained as to the actual commercial product. If comparative results are to be obtained it is necessary, in each test, not only to have the strength of the glue solution the same, but also the conditions of temperature and humidity. In the preparation of specimens for shear strength tests care should be taken to use wood of uniform quality, and to have the surfacing of the joint, the spreading of the glue, and the pressure as nearly uniform as possible.

Animal Glucs: Since these glucs, even when treated with formaldehyde or potassium bichromate to render them insoluble, are only partially water-resistant and therefore must solution, are only partially water-resistant and therefore must always be protected, severe deterioration tests are seldom made on them. Most of the testing is on those properties which are indexes of the strength, covering power, and keeping qualities of the glue. The determination of the moisture ing qualities of the glue. The determination of the moisture content is of value in indicating the elasticity of a glue, or its power to stretch slightly without fracture. A dry glue is low in clasticity, and, though it may be very strong under low in clasticity, and, frough it may be very strong timest seady stress, it fractures readily upon sudden application of and 18 per cent, but with a good glue it is not less than 10 per cent. The "water-absorption power" of a glue, or the amount of water as given amount of dry glue will absorb in 24 hours, is to a certaint extent a measure of its quality. Generally speaking, the lower the absorption, the better is centrally speaking, the lower the absorption, the better is the glue. Another property that is usually indicative of the character of glue is the viscosity of a solution of specified proportions of water and glue. As a rule, glues of high vis-cosity are of high quality and strength; hide glue, for example, which is more viscous than bone glue, is superior to it. Another common test used to check up the quality of a glue is the determination of the consistency or strength of a gally prepared in a specified manner. They are given would have high jelly strength, though this is not invariable. The ease with which a glue may be spread, or its covering power, is another property of much interest. This may be estimated from the water-absorption, viscosity, and jelly strength. The covering power is high when the water-absorption is the covering to the coverin strength. The covering power is high when the water-absorption is low, and the viscosity and jelly strength high. The keeping quality of a glue is one more important characteristic. Decomposition is due to hacterial action, and a slight actificity of the control of the contro

Tests for Hide Glue:

1. The viscosity is determined by allowing 200 cc. of glue at a temperature of 140° F. to flow through an orifice. The time required for water to flow through is taken as the stand-The approved instrument for this test is the Engler viscosimeter.

2. The jelly strength is determined upon a mixture of 12 parts water to 1 part glue. The glue is soaked, melted, and pourred at once into a vessel of standard shape and size. It is then allowed to stand at least 15 hours in a refrigerator at a temperature between 40° and 50° F. The test is made, as a temperature between 40° and 50° F. The test is made, either by comparing the relative strengths of two or more jellies by pressing the jelly with the fingers, or by causing a small plunger to sink down in the jelly a certain distance, and noting the weight required to do this.

3. The test for the strength of the property of th

and noting the weight required to do this.

3. The test for grease is unade by mixing a dye with a portion of the glue and painting the mixture on a piece of unsized white paper. Should the glue contain no grease the painted streak will have a uniform appearance, otherwise it will appear mottled or spotted. An excessive amount of crease is undestrable because grease has no adhesive qualities, for a small amount helps to precent icaming, particularly of a small amount helps to precent icaming, particularly and a small amount helps to precent icaming, particularly and a small amount helps to precent icaming, particularly and a small amount helps to precent icaming, particularly and a small amount helps to precent icaming, particularly and the precent icaming where the glue is to be used in a gluing machine in which it is agitated much more than when applied by hand.

agitated much more than when applied by name.

4. The test for foam shall be made on the sample used in
the viscosineter. The sample, after being heared to 140° F.
shall be beaten for one minute with a power egg-beater and
allowed to stand one minute before the height of the foam is measured. Glue that foams badly is objectionable because air bubbles are liable to get into the joint and reduce the area in which the glue is in contact with both the joint faces. 5. The odor of the glue when in hot solution must be sweet, and remain sweet for 48 hours; that is, free from any sug-

and remain sweet for 48 hours; that is, free from any sug-gestion of decomposing animal matter.

0. The adhesiveness of a glue is determined by a shear strength test made according to the following specifications, shearing strength of at least 24007/s0, inch, which requires a wood weighing 50 lbs. or more to the cubic foot. The dry gives the strongest glue, and applied to the wood in a manner gives the strongest glue, and applied to the wood in a manner gives the strongest glue, and applied to the wood in a manner gives the strongest glue, and applied to the wood in a manner gives the strongest glue, and applied to the wood in a manner put under a pressure of about 1502/sq, in, for 1520 hours, and when this is removed they shall be allowed to stand for 6 days more before testing. The specimens shall be finished to conform to the dimensions shown in fig. 1. They shall be specification covers shear tests for animal, albumen, and casein glues.

With the exception of the last, the above tests are not used for waterproof glues.

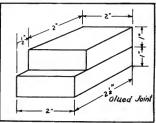


Fig. 1-Standard Shear Tost Specimen

Deterioration Tests: Beside the shear test just described, waterproof glues are subjected to the water test. Specimens, prepared exactly as for the dry shear test, and with no protective coating whatever, are soaked for 15 hours in water at 70° F. They are then tested in shear, without any preliminary drying, within thirty minutes after their removal from the

waterproof plywood panels further deterioration tests are required. 1 The boiling test; two specimens are boiled in water for 24 hours. The plies should show no signs of separation at the end of this time. This is an accelerated soaking test and has largely superseded the latter. 2. The bading test: two, specimens are baked in an oven at 212° F. to a the common practice to subject specimens, first to the boling test and then to the baking test. No specimens, first to the boling test and then to the baking test. No separation of the corners or piles should occur in this test. 3. The soaking test; the specimens are soaked two weeks in cold water and their condition noted from time to time.

It may be said in general that panels made up with animal glues, when unprotected with varnish, will never stand the soaking, boiling, or baking tests without serious injury, and

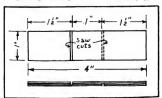


Fig. 2-Standard specimen for Plywood Shear Test

for the most part without complete failure. On the other hand, the best grades of both casein and albumen glues show very little or no deterioration under any of these, or other deterioration tests.

Strength Test Data: In the standard shear test with maple blocks, individual specimens will give maximum glue strengths of 2600-3000°/sq. in., with minimum values of 1800-2000°/sq. in, for lide, casein, and albumen glues.

The strength of glue as determined by sheat tests on 3-ply veneer specimens is very low by contrast. It ratiges from alout 150/250, in, to 400%/40, in under favorable conditions, shown in Fig. 2. They may be tested in an ordinary, cemen briquette testing machine, but special means of gripping the specimen must be provided so that the pull will be kept parallel tends to bend, because of the eccentricity of the loading, until the pulls are in line, and failure occurs from a combination of shear and cleavage. This effect is more pronounced as the thickness of the plus, and hence the eccentricity of

Bureau of Aircraft Production Specifications for Gluce

No attempt will be made to give complete, detailed specifications; only the more important requirements will be mentioned.

Hide Glue Certified for Use in Aeroplane Construction:
1. The plue must be a high-grade plue, were and free from
any deleterious substances. 2. The glue shall be tested, in
accordance with the methods previously outlined, by comparison with a standard sample furnished by the Forest Products
Laboratory, for adhesiveness, vincosity, jelly-strength, greate,
foam and odor. 3. The glue used in the adhesiveness test
should be mixed with water in four proportions, by weight:

4. That proportion of water which gives the greatest glue strength shall be used. For this best proportion no specimen may fail at a load less than 2200£/sq. in., and the average shearing strength must be 2400£/sq. in.

Handling and Testing of Hide Glue: This specification covers the methods and precautions to be used in the proportioning, soaking, melting and applying of hide glue. These have been given in detail in the section treating of hide glue. A shear-strength test must be made to ascertain the quality test specimens, J-inch boards, of the same class of material as used in the work on hand, shall be glued up under the same average conditions as those under which the regular work is conducted; no special precautions may be taken; these boards shall be clamped and dried, as for the usual shear test. Ten tested immediately. In at least eight specimens the strength of the glue shall not be less than that of the wood.

Casein for Casein Aeroplane Glue: 1. The casein shall be made from straight skimmed milk of low fat content and free from starch, dirt and other foreign material of adulterants. 2. The casein shall be precipitated by Inetic acid, sulphuric acid, or hydrochloric acid methods. 3. The precipitating temperature should be about 120° F., never more than 130° F. Only sufficient acid to secure a clear separation shall be used. The curd shall be well pressed, and dried without delay to prevent moulding. Casein made from mouldy curd will not be accepted. 4. With the sulphuric acid

process of precipitation, the cooked curd method is preferred. The temperature of cooking shall be about 1907-195° F. S. All vats, cloths, and other apparatus employed in obtaining the curd must be washed each day the equipment is used. 6. The specifications as to the properties of casein and the proportions of some of its constituents (above closely the properties) of some of its constituents (above closely the total constituents) and the properties of casein and the proportions of some of its constituents (above closely the total constituents).

Castin Giue for Airplane Constructions: 1. The certified gline shall be in the form of a powder not coarser than 50 mech. 2. It must comist principally of certified casein. 3. The manufacturer shall prepare definite instructions for mix-time and the control of the control of

Application of Certified Casein Joint Glue: The specifications regarding the mixing and application of this glue and the precantions to be observed, are embodied in the sections describing these processes for casein glue.

Relative Merits of Different Glues

Of the animal glues, only hide glue is suited to aeroplane work. This glue possesses the advantage of being inexpensive, familiar to most work-men, comparatively easy to apply, suited to be a suited of the property of the property of the property of work, of being difficult to protect from moisture, and of heing very seriously affected it exposed to moisture, and of heing very seriously affected it exposed to moisture, and of heing very seriously affected it exposed to moisture, and of heing very seriously affected it exposed to moisture, and of heing very seriously affected it exposed to moisture, and of heing very seriously affected in tis use. Unless conditions are very nearly right, its strength is apt to be uncertain. This glue shares here yet the seriously that the subject of the seriously the subject of the seriously the subject of the glue; because of the quick setting qualities of such glues, haste is necessified to the seriously and the seriously affected to the seriously the seriously the seriously the seriously that the seriously the seriously that the seriously the seriously the seriously the seriously that the serious

(The writer wishes to acknowledge the value, in the preparation of this article, of certain reports issued by the Forest Products Laboratory and used with the permission of the Government.)

(Continued from page 442)

noticed that at the rear end is a small air pump, operated by an eccentric on the vertical shaft, for maintaining pressure in the petrol tank in such machines as rely upon air pressure for the service of petrol to the Zenith carburetors. On the same casing, and just below the air pump, is fitted the interrupter gear for a machine-guo. The centrifugal water pump is mounted immediately over the oil pumps and is concentric with reference to the vertical shaft.

Although not a standard fitting, arrangements are provided for fitting a rotary distributor upon the forward end of the camshaft housing, for use with a compressed air starting installation. For the same purpose small non-return valves are fitted in each cylinder, these valves being of the mushroom type and normally held in a closed position by means of light springs.

A few interesting figures concerning the Siddeley Puma engine are as follows:

Output at 1,500 r.p.m	B.11.P
Output at 1,700 r.p.m	B.H.P.
Petrol consumption 0.575 pts. per B.H.P. 1	er hour
Oil consumption	per hour
Weight-dry	630 lbs.
Compression ratio	5.4/1



NAVAL and MILITARY AEDONAUTICS -



Report to Army Balloon School, Arca-dia, Cal. cal. maileon Scht eport to Aviation Supply De den City, L. I., N. Y. Report to Aviation General Depot, Morrison sport to Barron Field, Fort Worth, Director of Aircraft Pro-

Key to Abbreviations

HHM_P. to Kelly Fiel pareniheses.)
eport to Love Field, Dallas, Tex.
Report to Langler Field, Hampton,
Report to March Field, Allessandro,
Report to McCook Field, Obyton, O
croor to U. S. Naval Air Stat
Mismi, Fla.
eport to Post Field, Fort Sill, Okla
eport to Post Field, Millington, Te

t to Payne Field, RSD—Report to Rockwell Field, San Diego

al.

port to Rich Field, Waco, Tex.

port to Taliaferro Field, Fort Wor

ex. (When specified in the ord

e number of the field is given parentheses.)
teport to Taylor Field, Montgomery,
Ala.

eport to School of Military Action, University of Towns. SUT - Expert is Manufacture of the Control of the C

Note 1-Report to places mentioned in the order named

Note 2-Report to Camp Pike, Arkansas.

Note 3-Report to Fort Logan, Colorado. Note 4-Report to Director of Air Service. Note 5-Report to Walter Reed General Hos-

pital, Takoma Park, D. C. Note 6-Report to 1550 Woodward Avenue, Detroit, Mich.

Note 7-Report to Director of Purchase, Storage and Traffic, Washington, D. C.

Note 8-Report to General Hospital No. 21, Denver, Colorado.

Note 9-Report to Pope Field, Camp Bragg, Fayetteville, N. C.

Note to-Report to General Hospital No. 2, Fort McHenry, Md.

Note 1t-Report to Speedway, Indianapolis,

Note 12-Report to Middletown, Pa.

Special Orders Nos. 96 to 101, Inclusive

Special Orders Nos. So to 101, inclusive
A
Andrew, Flynu L
Alexander, Wriston Charles Note 2
Brooks Aribur Raymond
Cowan, Royal Wesley BurnettFLA
Dezendorf, Edward Hamilton
French, Samuel BRSD
G
Goodale, Frank W
Gustafson, Chartes L
Harris, Andrew Ross Note 2
Johnson, Arthur Lowell
Kennedy, David SheltooFLA
Miller, Charles L
Peck, Norman W
Rudotph, Jacob H
Swant, Jacques M
Weber, HarryNote 2

Officers Rated as Observera The following-named officers, having

completed the required course, are hereby rated as Observers: First Lieuts. Sidney P. Le Boutillier, James P. Carberry; Sec-ond Lieuts. Glennen K. Vars, Benedict Fox, Jerry L. Bennett.

Air Service Officers Discharged

Washington, D. C .- The following offi-Washington, D. C.—The following offi-cers are honorably discharged from the service of the United States; Majors Harold R. Eyrich, Robert Marsh, Ir.; Captains Paul B. King, Edwin J. Fredell, Edwin F. Kingsbury; First Lieuts, Alvin C. Goetz, Charles R. Jacobus; Second Lieuts, Charlie D. Coleman, Thomas J. Naughton, Irwin Wheeler, Wilson S. Zimmerman.

Colonel Woods in Charge of Division of Information

Col. Arthur Woods, formerly Police Commissioner of New York City, has been placed in charge of the Division of Information, a bureau for the sole benefit of those men who have been discharged from the military service and wish to be directed to information concerning their bonuses, War Risk Insurance, civil rights, vocational training, and in general just what the Government is doing to help them re-establish themselves in civil life.

Ruggles Orientation Demonstrated to General Menoher

Washington, D. C.-The operations of Washington, D. C.—Ine operations of the Ruggles Orientator used by the Army Air Service for instructing fliers was demonstrated on April 16th, at the Air Service building. Major-General Charles Service building. Major-General Charles T. Menoher, Brig.-General Wm. Mitchell, Colonel M. F. Davis, Colonel T. de W. Milling, Colonel George H. Crabtree and other officers of the Air Service were present. The machine was demonstrated by Mr. W. G. Ruggles, the inventor, and Major F. J. Martell, General Mitchell and Col. Davis also thad rides.

Personnel Board For Air Service Appointed

Washington, D. C .- A Board of Officers Washington, D. C.—A Board of Officers to consist of the following personnel has been appointed to consider such matters affecting the personnel of the Air Service Arcinautics, Lieutenant-Colonel Rush B. Lincoln, Air Service Arcinautics; Lieutenant-Colonel Rush B. Lincoln, Air Service Colonel Rush B. Lincoln, Air Service (Lieutenant-Colonel Rush B. Lincoln, Air Service (Major Horace M. Hickam, Junior Military Aviator, Air Service Aeronautics; First Lieutenant-Jones A. Healy, Air Service Aeronautics, Recorded,

Army Aviators Pass R. M. A. Test

Washington.—The following-named of-ficers, having completed the required tests are rated as Reserve Military Aviators:

Major Louis B. Knight,

Captains William S. Reyburn, Daniel Buckley, William M. Marrs, Walter R. Lawson, Albert C. Lord, Charles H. Schumacher.

Souther Field Notes

A committee of four prominent Thomas-A commutee of four prominent momas-ville, Ga., citizens motored to Souther Field recently for the purpose of securing a flight to that town on April 26th. They took back with them Lieutenant John MacRae, through the courtesy of Major Mackae, through the country of analysis Schofield, to advise on the proper selection of a landing field. The visitors were Mr. E. R. Jerger, Editor Times-Enterprize, F. B. Harris, R. G. Mays and J. C. Vaughn. Thomasville's enterprise is admirable.

On April 19th, the third Souther Field Victory Loan squadron left for Atlanta to cooperate with the flying circus there and distribute literature en route. Four Souther Field Victory Loan squadrons left Souther Field this week to cover Georgia and surrounding states.

Airships More Efficient for Patrol Duty Than Aeroplanes in British Anti-Sub Service

Washington, D. C.—The following figures on the British anti-submarine patrol were recently given out by the War De-

June-Dec., 1917	4irships	Planes	Ratio 11 Favor e Aurship
Patrols per craft	42	18	2.1
Hours flying per craft	226	36	6-1
Miles flying per craft	6452	2201	3-1
Escorts flying per craft	6	1.6	4-1
JanApril			
Patrols per craft	37	17	2-1
Hours flying per craft	241	34	7-1
Miles flying per craft		2081	. 3-1
· Escorts flying	9	1.3	7-1
Men per hour flight	2.3	4.7	2.1
Hours flight per man	.63	.24	216-1
Miles per man	52	47	

Surplus Property Board Appointed

A Board of Officers to consist of the following personnel is appointed to determine the amount of surplus property of every kind in the Air Service: Major Harry Graham, J. M. A.; Captain Rajoh J. Moore, Captain Louis B. Montfort, Captain Frazer Hale.

Construction and Electrical Engineer A. W. Duff will proceed from Washington, D. C., to Langley Field, Hampton, Va., reporting upon arrival to the Commanding Officer for temporary duty in connection with photography of bomb sights and bomb trajectories.

Second Lieutenant Walter L. Perley, Armonic Service Production, will proceed from Washington, D. C., to Chicago, Ili, thence Washington, D. C., to Chicago, Ili, thence Washington, D. C., thence to Swissdale, Pennoyen Control of the Control of the

Spherograph to Aid Training

Under direction of Professor Henry Lane Eno, of Princeton College, and Mr. O. V. Fry. of the Psychological Department of Princeton University, has designed and developed a device known as other words of the properties of the pro

It is so arranged as to develop the actual movements of a plane in the air with the exceptions of the movement of translation. By means of controls, similar to controls of a plane, the prospective

combat-flyer aims his gun by moving his entire machine. When a target or objective is presented to him by the man in charge of the test, he pulls his fringer cation of the moving trigger, the way the flyer manipulated his machine and the exact location of his sights at the moment officer in charge to determine just what defects in marksmanship are shown and just what the flyer will have to do to remedy those defects. Insomuch as it is chine at any given moment, as well as the rate of speed of either of the planes, the apparatus lends itself uters and the activities that go to make aviation.

The Long Island Aviation Flying School

Pilot-Instructor Bruce Eytinge, of the Long Island Aviation Company has drawn up an interesting form upon which detailed progress records are kept of his pupils at the Central Flying Field. The record sheet is provided with space

of the popular three Central Psych Resector recording the dates of each step in the instructing beginning with "lesson I" "fround lecture" to "lesson I" "surversible the light," in successive steps as followed to the light, and light, a

In advance instruction, "lessons 20 to 20" following manocuvres are included: Advance Instruction: Forced Landing-Solo; Spinning Nose Dive; Stalling and Tail Side; Steep Turns and Vertical Banks; Immelman Turns; Looping; Falling Leaf; Half Roll; Roll

Favorable weather continues to bring out many visitors to the school, where the machines are always in readiness for light. On Saurday, May 47d, a short large the machines are substantially supported by the substantial sub

Cadets' Pay

Under a recent decision of the Comptroller of the Treasury, the Director of Finance has been authorized to make payment of all arrears in cadets' pay while in training for commission, in accordance with the following:

ance with the following:
Cadets in the air service in training
for commission should have heen paid
\$100 per month as follows: Those at
flying schools from July 13, 1917, to include June 30, 1918; those at ground
schools from August 21, 1917, to include
June 30, 1918 to include June 30, 1918.

After July 1, 1918, their pay was re- fl

duced to \$33 per month at both flying and ground schools. Cadets serving at flying fields, if placed on flight duty by special orders of the commanding officer of the field at which serving, are entitled to 30 per cent. increase on \$33 per month, for the period covered by such orders.

Cadets serving overseas in the American Expeditionary Force who received \$100 per month are not entitled to increase for foreign service.

All cadets who have a just claim for arrears in pay while serving as cadet in training for commission will write to the Director of Finance, Discharged Enlisted Men's Pay Branch, Room 3303, Munitions Building, Washington, D. C., requesting that they be furnished with the necessary blank forms to enable them to properly file claim for back pay which is due them.

Dorothy Dalton Flies for Victory Loan

Dorothy Dalton, whose dimples and smile have charmed millions in Thomas H. Ince productions for Paramount pictures, achieved the distinction of being the first lady passenger to travel by hydroacroplane from Keyport, N. J., to Albany, N. Y., on April 2D Miss Dalton made Governor Benjamin Strong, of the Federal Reserve Bank, to Governor Smith. It would have been much cheaper to have sent the message by mail, and also quicker, the control of the sent of the sent much cheaper to have sent the message by mail, and also quicker, means, came near making the world's record for slow flying. This, however, was because whenever Miss Dalton spied anybody down on the ground who alight and sell him a Victory Loan bond.

In fact, the whole affair was arranged to hoost the Loan. Miss Dalton has been indefatigable in placing bonds where they would do the most good ever since she arrived in New York some days ago, the she was the same of the common that the fact of the Columbia Yacht, club at the foot of Eighty-sixth street. A big crowd had gathered, but before Miss Dalton could make up her mind how much she ought to get out of the bunch, have good to go the constant of the Wictory Loan Committee, ordered a change to Keyport on account of wind conditions. As it is a good two hours and a half by motor to Keyport, the Eighty-sixth street the time being at least.

The start was made from the factory of the Aeromarine Plane & Motor Company at Keyport at 3 p. m. At 8:40 p. m. Miss Dalton handed Governor Smith Governor Strong's message.

After delivering her message Miss Dalton was rushed to various Victory Loan meetings, at each of which she was acfered to the control of the control of the first meeting she sold \$5,000 worth of bonds in three minutes. Other meetings also yielded results so assistatory that any dinner and that luncheon had inadvertently been overlooked. Next morning she headed a Victory Loan parade in Albany, receiving accidian which unlars in bond selling. She returned to New York in the afternoon after the basiest 20 hours in her experience. Now fying.



NEWS FOREIGN



Peru Establishing Military Aviation School

The Government of Peru is arranging for the establishment of a military aviation school. It is proposed to secure the services of French aviators who have seen service in the war to instruct the Peruvian

North Sea Service of the Blackburn Aeroplane Company

Directly the bar to civilian flying is removed the North Sea Acrial Navigation Company will begin to operate arcraft between Hull, one north to Gothenburg and Christiania, another north-east and east to Stockholm, Helsingfors, and Petrograd; and the third to Amsterdam and Rotterdam.

Armstraig, Whitworth Cs. Made Over 1,000 Aeroplanes.
London-The controots was production of the Armstrong, Whitworth
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Correctif 1,100 gas and meantings. CThis pumber, which includes the
Confidence of the Confidence of

British Entry for French Competition

At least one Britton Lawry for Proceedings of the Competition, which is being organized in Finner, the British Aerial Transport Co. having entered through M. Fierre Marchal, one of the will consist of a flight round France in stages, aggregating 2,500 miles, and the prizes will be awarded according to the showing of the machine weight to speed and oost per from mile. Hinteg power, speed, ratho of weight to speed and oost per from mile. The growth of the machine that the contract of the machine contract of

Commercial Aviation Attracts Large Capital in India

Commercial Aviation Attracts Lurge Capital in India Plans are going hade energetically for the extlabiliment of cona company with a capital of \$13,000,000 to sure a number of air router. For tirel lines, it is aid, will be indicented Delsh Stolke, Laborts Bendy, and the sure of t

French Aviator Carries American Officer from Brussels to Paris in 85 Minutes

Adjutant Larmande, Squadron 472, French Air Service, carried an American officer bearing important diplomatic correspondence from Brussels to Paris in 1 hour and 25 minutes, averaging 125 miles an hour.

Congress of Human Flight in Session at Paris In 1913 M. F. Roidor-Séville organized the first Congress of Human Flight in Seville organized the first Congress of Human Guntries were present. There was to be another congress, in 1914, but the war intervened. Several members are no more, but the remainder have been convoked and have resolved to continue the good work.

Farman 6-Passenger Planes for Paris-Bordeaux Service

Farman Frères are establishing a Paris-Bordeaux passenger service. An F.50, piloted by Lieutenant Constantin, accommodating six passengers will be used.

French Aviation Appropriation Nearly \$200,000,000 After remaining the company of the control of the control of the appropriation to a figure \$1,500,000 [sea shash the original budget, which amounted to \$200,500,000,00 criticism was made of the one utilization of captured German planes, but it was pointed out that considerable aftera-control of control of the control of control of the control of the control of the control of the military.

Regular Passenger Service Between Rome and Naples Operating On April 6th an airship of a large type began a regular passenger service between Rome and Naples. The ship carries 36 passengers.

Swiss Government Aids Aircraft Industry

Swiss Government Aids Aircraft Industry
In order to awaken general insertes in acronauties and to assist the
interest of the swissers of the swissers of the swissers of the swissers
for passenger carrying flight. All flights commence at Dukendorf. The
minimum rate is 50 fec, for a quadret of an hours' flight, but if over
the repro. simulated south of the line Robrechak bit. (all/innekwidWatten-Urane's brisneric Lucerne Nayl-Thomor Gongoleve Build-Dard to
Each landing market at the request of the passenger will cost him 25 to
10 (xz, vnd. a supelement of 2 fees, for each quarter of an hour the
any intermediate stops, will be 100 (xz. Trom Thomor Jungfrau and
regurn in 500 fees, whilst the flight Lussumen Accurches Neuchall costs.)

The authorities are taking no undue risks. Payment must be made in advance, and should the passenger wish to take a camera or cinema-camera with him he must pay another 50 fcs. for each quarter of an

hour. Minors must, in the absence of their parents, have a certificate abowing their parents' consent to the flight. In general, all persons under 18 or over 60, or who suffer from heart trouble, anaenia, epilepsy and other nervous maladies are not to be allowed the privilege of figures.

Five Sesplane Carriers in British Atlantic Fleet
The arrangements made for the composition of the British Atlantic
Fleet.
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Aero Union of the Transvasi Formed

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As an indication that servoanties is spreading to all corners of the
following the service of the service of the service of the
Africa.

At a mering presided over by the Mayor, at Johanseburg, on
the objects of which are "the education of the people in the development and possibilities of aeromatries, to necessing the establishment of
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Work of French Seaplanes in War

The following statement has been issued regarding the work of the French Naval Air Service:

ACTIVITY OF THE SEAPLANES, OCTOBER, 1917-AUGUST, 1918

Moath	Number of Flights made	Hours of Flight	Distance covered (miles)	Sub- marines sighted	Sub- marines situcked	Mines dis- covered
1917				-		
October	1,667	3,094	184,730	7	6	
Novamber, .		3,265	191,000	15	12 7	
Dacember	1,730	2,671	147,000	7	7	
1918	1					
January	2,236	4,139	214,870	7	6	2
February	2.115	3,690	215,000	8	6	4
March	2.210	4.099	237,410		7	8
April	2,647	4,808	284,920	11	8 22	84
May	3,510	7,652	437,200	22	22	10
Juny.	3.365	6,758	387,940	9	11	0
July	3,959	7,432	432.000	10	1 11	12
August	4,268	8,594	495,700	19	11 14 12	12 6
real age	T,605	0,004	103,700	20	12	

norman ruren 19,000,000 Rounds at Ground Targets in Wa-London, April 24—The Air Ministry, in a published report of the work of the sir force during the war, says that before the war the art force consisted of 22 mechanisms and 1,47 men, while in October, 1995, there were 20,71 mechanisms, 27,000 officers, and 25,54s men. 1975, there were 20,71 mechanisms, 27,000 officers, and 25,54s men. 1975, and force of the western front hought down 7,05 enemy aircraft, dropped 5,042 tons of bombs, and fired more than 10,500,000 rounds at ground target. British Airmen Fired 10,500,000 Rounds at Ground Targets in War

Argentina Watching Aeronautical Developments

Argentina Watching Aeronautical Developments
According to stamments appearing in the British aeronautical preas,
Air Force have been approached by the Argennine Legation in London
with retirence to their utilization in the Argentinana Army. Avanton
with retirence to their utilization in the Argentinana Army. Avanton
been issued to the legation in that connection, but that, on the other
hand, the Argentina entherines are very keeply interested in aerogrant and the army of the Army

British Airahip Patrolled 66,200 Miles in 2,500 Hours Flying Time During War

During War

There have been some wonderful endurance records of British airships during the war. One sirahip had a life of 2 years 75 days, during
which it flee 64200 miles in 2500 hours figure gime. Another airship
line line with the description of the British Air Force flew 2,250,000 miles during
the course of the war.

Bristol Company Builds 14-Passenger Commerce Plane

Bristol Company Builds 14-Passenger Commerce Pinas The Bristol Acceptance Co. of Endand has constructed a new passenger The Bristol Acceptance Co. of Endand has constructed a new passengers has a scaling capacity for 14 passengers in addition to the necessary mechanics and pindly. On the trial ring of carried 22 passengers, pist and of 125 mp.h. The passenger about is ventilated to avoid definite. The machine stands 20% (i. high and from up to ing measure 41% (i. high pindly of the height of at least 2 miles and as 10,000 ft. to give the aeroplane a speed of 112 mp.h. The engine houses the built on the middle of the three of 112 mp.h. The engine houses the built on the middle of the three power being 1400 hp. Flight can be maintained by any two of the four engines should the others break down.



ELEMENTARY AERONAUTICS

MODEL NOTES



A Scientific Flying Model

WHILE on the subject of flying models, we must not forget one very important type of model known as the Scientific Model or one in which a regular tested wing curve is used.

If you are building models and the only reason you are is the pleasure you get from flying and building these models, I would like to have you start on one like the one shown in the accompanying drawing, as this model is not only a good flyer, but will show many advantages you have never seen in any of your previous models.

years ago it was custom among the model clubs and model flyers to have efficiency contests for flying models. The contest was decided by the model carrying the greatest load for a certain surface area, etc. In this way many little things were found that never dawned on us before and the result was we built some of these ideas into our racing models, and made longer and better flights.

I would suggest selecting a certain fixed area, about 144 square inches (as I have in the model shown in the drawing) for the main plane, and about 40 inches in the elevator. is a fair average for this type of model and the one from which we will get the best results.

Many little experiments can be carried on by the aero-modelist such as using raked edges, then wings without the modelist such as using raked edges, then wings without the rake, arrow shaped wings (that is, with a sweep back) with or without a dihedral, or even a reverse dihedral, that is, have the wings sloping downward instead of upward. Different loads can be carried at different angles of incidence and the most efficient angle can then be found.

In fact almost every conceivable kind of an experiment must be taken into consideration and I claim that when you have finished with this model you will be able to build long distance flying models that will go hundreds of feet farther

than your previous models.

New tricks in design are what make an aeroplane better and it is not necessary for one to be an expert engineer to invent or develop some little thing that will improve the aeroplane or make aviation safer and more interesting. The field is large and you, the model fliers, have the same chance as those who went before you and who are to-day making aviation

The building of the model shown herewith is really simpler than it looks; the only catch is to get the Balsa Wood that is needed for the wings and motor stick.

While the wings look as if there are too many ribs, this is not the case, as we are using a true wing curve and it is neces-sary to preserve the wing section along the whole length of the wing, otherwise the fabric would cave in between each rib and the wing section would be correct only at each rib.

The ribs of the wings are made of this Balsa Wood. (Balsa

Wood is the lightest wood known, its weight being about onetenth the weight of spruce.) And it can be purchased from almost any model supply house. If your particular supply dealer does not carry it you can purchase it from The Ameri-can Balso Co., New York City.

To construct the ribs, select a block of the wood and shape it like the wing profile shown at the right hand lower side of the cut.

The wood should be so shaped as to have the grain running

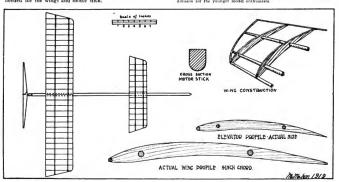
the length of the ribs when you finish.

After shaping the wood to the proper wing curve holes should be drilled for spars. Then ribs 1/16" thick should be cut from this block with a saw.

The ribs for the elevator are also made in this way and The ribs for the elevator are also made in this way and when all are finished they should be run on round spars made of dowel sticks and glued in place. Care should be taken not to split the ribs when putting them on. It would be good practice to make the hole in the ribs a trifle larger than the practice to make the hole in the ribs a trifle larger than the diameter of the spart. The spars as the large plane are \S_2^* and in the elevator $\Im A \Im = 1$. The entering edge of both elevator and when the sparse is the sparse is the sparse in the sparse is the sparse of the sparse is the sparse in the sparse in the sparse is the sparse in the sparse in the sparse is the sparse in the sparse is the sparse in the sparse is the sparse in the sparse in the sparse is the sparse in the sparse in the sparse in the sparse is the sparse in the sparse in the sparse is the sparse in the sparse in the sparse is the sparse in the sparse is the sparse in the sparse is the sparse in the sparse in the spa

Aero Science Club Note The Aero Science Club recently held its annual meeting and elected

The Ares Science Chis recently held in annual meeting and elected the following fifteen: Previously, M. Arribur N. On, Vice Providents of the Chicago and Chicago





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Aeronautic Journalism

In a newspaper report of the flight of Mr. J. II. Thomas, M. P., to Paris, our contemporary, Flight, noted the statement that when Mr. Thomas arrived on the aerodrom "H.M. airliner 'Silver Star,' a twin-engine converted Handley Page bomber, resplendent with new alumminium paint, was ready with the engines running." Mr. Thomas immediately entered the machine and "a moment later the pilot, Major McCrindle, called out 'contact'; the blocks were knocked away from the wheels, and Mr. Thomas was away on his journey."

It was thoughtful of the pilot to call out "contact" while the engines were running so nicely with the switch off. And what a voice for the parade ground Major McCrindle must have!

So There's Nothing to Worry About

- "Suppose your parachute didn't open, my good man?"
- Suppose your paracinate unit open, my good man.

 "Ah, let's suppose, madam."

 "But what would you do?"

 "I should probably 'do' the undertaker, madam. My bank account is fearfully overdrawn."—From Aircraft,

Invent One for Both

- She: "Do you think women will take to the air?"
- He: "Not for five or six years."
- He: "Because it will take that time to evolve a perfect
- silencer for the engines."

 (Dear Reader: We ran short of jokes this week, so please excuse this one.—NUTTY EDITOR.)

Archie takes lunch at the Aircraft Factory

From Flight

Quentin Roosevelt

Birdman who gave up your life, For the noblest cause in the world, Aiding the world in its strife For the fairest flag unfurled, Liberty credits you, Who fought for us in the blue-

You who have given all Without a word of protest; Who answered the final call,

And went to a glorious rest-No enemy hated you, Warrior who winged the blue.

For who could question the cause. And see its leader's sons Never thinking to pause, While sons of leading Huns, Knew naught of do nor dare, Or conquest in the air?

The Huns have spoken to me And have said it time and again, And have said it time and again That you were one of a free And undaunted union of men. That your name would ever live, With a halo shining bright;

That your life was given to give That the wrong might learn the right. Now we are learning today.

That which you knew before— hat the life which you gave away, Was not a loss in the war, -Arthur Winfield Scott.

2nd A. I. C., France.

At the Scratch

The butterfly Wings of gold; The firefly Wings of flame; The Cootie Has no wings at all But

He gets there just the same!

A C Spark Plugs have always met the emergency. For years they have been standard equipment on most fine motor cars. When the government needed aircraft plugs A C's led all others in the competitive tests and as a result were chosen as standard equipment for all Liberty and Hispano-Suiza airplane engines. We are now in position to execute private orders for aviation plugs promptly.

Champion Ignition Company, FLINT, Michigan
U. S. Pat. No. 1,105,1727, April 13, 1013, U. S. Pat. No. 1,216,170, February 18, 1017.



AEROPLANE INSURANCE

Merchants Fire Assurance Corporation of New York

announces the appointment of

MR. AUSTEN B. CREHORE

as Manager of their newly established Aviation Insurance Department.

Mr. Crehore was for two years a Pilot of the Lafayette Flying Corps and is an insurance man of considerable experience and for these reasons we consider him especially qualified to manage this branch of insurance. We are therefore prepared to furnish all forms of aerial insurance coverage, and quotations will be gladly given and full information submitted.

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FIRE-AUTOMOBILE-TORNADO-EXPLOSION-RIOT AND CIVIL COMMOTION

The Royal Flying Corps

used over eight thousand quartered oak, variable pitch, Paragon Propellers—all of one design. Not one of these propellers was ever returned as unsatisfactory from the field. Only four failed to pass final inspection. Average shipment was 200 per week on this order alone. In October 1918 official tests showed two miles per hour faster speed and one third faster climb than any one of four competing designs. The new Paragon Booklet will tell many more interesting things.

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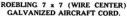


AIRCRAFT, WIRE, STRAND. CORD

ROEBLING 7 x 19 TINNED AIRCRAFT CORD.



ROEBLING 6 x 7 (COTTON CENTER) GALVANIZED AIRCRAFT CORD.





ROEBLING 19-WIRE GALVANIZED AIRCRAFT STRAND.

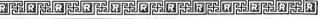


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ITHACA . N.Y. U.S.A.





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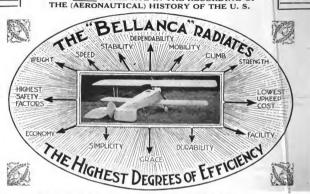
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Hagerstown, Md.

\$3500

Harry E. Tudor

SPECIFICATIONS AND ALL INFORMATION ON REQUEST:-Sales Manager

Aircraft Manufacturers

299 Madison Avenue

New York City

(Continued from page 443)
have to be carried, and in spite of the
lower power the speed is over 100 m.p.h. A military Martinsyde machine with the same engine is the holder of speed records for machines of this type, and it may safely be assumed that the trans-Atlantic

type is not inferior in any way to the standard type, The Fairey Machine

The Fairey Machiae
The machine entered by the Fairey
Aviation Co. has the distinction of being
Aviation Co. has the distinction of being
one less standard type, resembling the wellknown type of 3C. Fairey seaplane. The
most remarkable leature of this anothine
is, of course, the variant camber wings
of the course of the control of the course
is, of course, the variant camber wings
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of the by having the entire trailing edge of the planes hinged along the rear spars in such a manner that the pilot can, by turning a wheel, pull down the whole trailing edge to give greater lift, and again raise it to provide less resistance and hence greater speed. In the ordinary way the greater speed. In the ordinary way the chief aim of this variable camber is to provide a low speed on alighting and getting off, but for the Atlantie flight it will also be found useful in providing greater lift while the machine is heavily loaded, allowing of gradually flattening out the wing section as the load becomes less owing to the fuel being consumed. In will probably be made at a slower speed than that obtained towards the finish of

the journey. The engine is, as in two of the other machines entered, a Rolls-Royce Eagle' of 375 h.p., and the speed of the machine is stated to be about 120 m.p.h. This figure probably refers to the speed with the trailing edge in line with the rest of the wing section. With the trailing of the wing section. With the trailing edge pulled down the speed will be eon-siderably lower.

The Whitehead Machine

We have not, for the moment, been able to obtain any particulars of the machine the Whitehead firm propose to use, and can only wait until Mr. Whitehead is prepared to disclose the type with which they may make a bid for the prize.

The Handley-Page Machine

The Handley-Page machine is one of the standard type four-engined bombers, slightly altered in details, and fitted with a very large petrol tank in the fuselage. a very large petrol tank in the fuselage. The four engines—in this case Rolls-Royce "Eagles"—are placed between the required for the part of the required feet paid frives a tractor screw, while the engine belind it drives a propeller. As the pusher screw has to deal vest at a freedy set in motion by the standard and the standard freedy set in motion by the standard for the standard freedy set in the standard freedy set in

hood of 100 m.p.h., which would give a range of about 2,100 miles. Since, how-ever, the machine will fly at a smewhat lower power for the sake of fuel economy, and the prevailing winds are wisterly at and the prevailing winds are wisterly at this time of the year, it is reasonable to suppose that this speed of 100 m.a.h. may be maintained with the engines partly throttled down, thus further increasing the margin in hand. After a few hours' flight two of the four engines will probably be sufficient to keep the machine going, although at a reduced speed, and this would give the engineers a chance to this would give the engineers a chance to put right any little defect that one or more of the engines might develop. The number and names of the crew have not yet been announced, but one of them will be a Marconi operator, who will attend to the directional wireless set, which will have a range of about 250 miles. An in-stallation of smaller radius will also be stallation of smaller ratins will also be earried to facilitate communication with ships. To provide for emergencies, a small wireless set is installed in the tail of the machine. The reason for placing it here is that in case of a descent in the it here is that in case of a descent in the sea, the tail will probably stick up out of the water, thus enabling S. O. S. messages to be sent. In view of the fact that four engines are fitted, it is improbable that complete engine failure will be encountered.

The following brief particulars of the Handley Page machine should be of interest:

Span, 130 ft.; length, 75 ft.; height, 23 ft.; weight, empty, 14,000 lhs.; weight, fully loaded, 32,000 lbs.



Vol. 9, No. 10

MAY 19, 1919

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An Aerial View of the Downtown Section of New York City

Second Pan-American Aeronautic Convention Discusses
Aeronautic Problems of Great Importance Discusses





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MAY 19, 1919

No. 10

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VOL. IX

NEW YORK, MAY 19, 1919

NO. 10

SECOND PAN-AMERICAN AERONAUTIC CONVENTION DISCUSSES AERONAUTIC PROBLEMS OF GREAT IMPORTANCE

Meetings and Field Events Well Attended

VISITORS from all sections of the United States and from twenty other nations have been present at the meetings, field events and contests of the Second Pan-American Aeronautic Exposition at Atlantic City during the past week, notwithstanding the somewhat adverse weather conditions.

R-34 to Make Atlantic Trip

Official word that the R-34, one of the new type British dirigibles, is alated to make a trans-Atlantic dash within the next three weeks, was given at the "inside" dedication of the Atlantic City Air Port-a luncheon given in honor of Brig-Gen. L. E. O. Charlton, British Air Attaché, and the first officer in the world to be appointed to such a post.

The luncheon, held in the submarine grill of the Hotel Traymore was notable for the representative aerial experts of many nations who were at the table as well as the message of Gen. Charlton that the Atlantic City. Air Port was the probable destination of the British dirigible now undergoing final tuning up for the big hop to American shores.

"It is intended to send a dirigible across to this coast this month or, if some unforeseen holdup occurs, as early as possible next month," Gen. Charlton said. "As to the actual terminus, I have strong hope it will be Atlantic City, although I have not received any official notification of the landing place so Iar."

It is believed, however, that the world's first air port will receive the honor because of the strong invitation that has been sent to the British Air Ministry and by reason of the cordial relations early established by the General with the officials of the Aero Club of America, the Aerial League, the Pan-American Aeronautic Federation. In the course of his speech Gen. Charlton said:

"I might prognosticate that the era of aerial trans-Atlantic bridge building is today having its foundations laid. Heretofore the occans have been the sole connecting link between the Americas and Europe but the time when the air will unite them is ago wery near.

"I have visited your great air port here and been impressed with its wonderful facilities and possibilities. Atlantic City is a happy augury. Its cosmopolitan roster of visitors assures wide dissemination of the aerial developments that are bound to be an integral part of the resort's life in the future through the splendid courage and confidence of the men responsible for the creation of this port.

The responsible to the creation of unit points. The steam Avatation is the reserved filled of withaution. The steam that the reserved is the reserved to the control of the which we have been long accustomed—are its elder brother. In the short span of time covered by the period of the war we have jumped from the activities of that elder brother until now fighting in the air is the rule rather than the exception; parachutes have been tested and found to be in fact the life preservers of the air, adding to the safety of air travel and giving the general public the confidence in the [greatest creation of mankind; night flying is something common now the infant new-born when the armistice was signed has now reached the age of reason, adolescence and maturity are of the near future.

President Alan R. Hawley, who presided at the dimer which was substituted for the outside ceremonies in the dedication of the big air port when inclement weather interfered, received a substitution of the properties of the prope

Establishment of Engineering Experiment Stations Advocated

Establishment of engineering experiment stations in each state and territory of the country to do for engineering, industry and circince what the agricultural experiment stations have been doing for agriculture and the farmers during the past thirry years, was advocated at a meeting on the Steel Pier by 7. V. Stephens, of New York, consulting engineer for the Coorgia School of Fechnology.

for the teergra School of Technology.

Mr. Stephens, who is the author of what is to be known as Mr. Stephens, who is the author of what is to be known is the stephen of t

"The university and technical school has and always will to the chief source of all new scientific truths and men trained to the chief source of all new scientific truths and men trained tion are in the colleges the quicker we will see aeronautics take its true place in the civic and industrial life of the na-tion. A chain of experiment stations of an engineering and industrial character in eyery state, with each commonwealth probing into its own peculiar resources and the central control located in one of the departments at Washington, with both the state and Federal Government financing the stations, would so mobilize the nation's industries that America's position as the world's leading nation would be permanently established.

issued.

"Our agricultural industry was so well systematized that without much additional expense over the regular annual appropriations we were enabled to not only feed ourselves but the world in addition during the world period," Mr. Stephens declared.

The bill has the backing of the executive committee of the Aero Club of America.

Navy Congratulated on Trans-Atlantic Start

Enthused over the progress of the trans-Atlantic "hop" of the big Navy seaplanes, delegates and members of the Second Pan-American Aeronautic Convention adopted resolutions, felicitating the Navy and the members of the overseas crew upon their successful completion of the first two legs of the

The resolution which was adopted amid cheers at an afternoon session of the convention read:

"The officers, delegates and members of the Second Pan-American Aeronautic Exposition, now in convention as-sembled at Atlantic City, send you God-speed, good luck and best wishes for a successful voyage with greetings from the new world to the aviators of the old,"

The message bore the signature of Alan R. Hawley, president of the Aero Club of America, who was the author. The message was cabled to Trepassey, N. F., to the commanders of the airshins

Resolution of Condolence

The convention today also adopted resolutions of sympathy to General C. T. Menoher, chief of the Air Service, over the death of his wife. The resolution declared:

"Whereas, the officers, delegates and members of the Second Pan-American Aeronautic Convention have learned with ex-treme sorrow of the death of Mrs. Menoher, it is resolved treme sorrow of the death of Mrs. Menoher, it is resolved that the earnest and profound sympathy of the Second Pan-American Aeronautic Convention be extended to General Charles T. Menoher to whom our every condolence is ex-tended at this time of his great loss."

"Mother's Day" Memorial Service

Posthumous honors for the 935 gallant Americans who lost their lives while fighting the battles of civilization and humantheir lives while lighting the battles of civilization and numanity in the air were awarded by the Pan-American Aeronautic Convention as the feature of "Mother's Day"—the diplomas, following the reading of the roll of honor from the platform of the convention by Secretary Augustus Post, of the Aero Club of America, being forwarded to the mothers or wives of the dead heroes.

of the dead heroes.

Forty different states were represented among the 935 airmen whose memory was honored by the impressive services on the piec, when the piece was a honored by the impressive services on the piec, when the piece was the piece of the

Niles, G. Douglas Wardrop and A. S. Abell, 3rd, presented their report through Mr. Fost.

"This diploma of Honor of the Aerial League of America, read:
"This diploma of Honor of the Aerial League of America is awarded to ..., in recognition of the patriotic service which he rendered to the cause of humanity and civilization in the service of the United States during the war" and bore the signature of Robert E. Peary, as president.

Aerial Mail Day

Aerial Mail Lines had their inning Wednesday at the Convention. Although unfavorable weather conditions prevented the delivery of the first bag of mail to the shore post office by use of a parachute dropped from an aeroplane in demon-strating how this means of "smashing" can expedite delivery by permitting the mail pilot to continue on his route in full ing instead of making stops as now necessary. Interesting facts regarding the success that has attended the air post not areas regenum; the success that has attenued the air post following in America but on long hauls in and between other countries were revealed in lectures at the convention hall. The experiments that have been in progress at the air port since the opening of the convention a week ago by Leuenana I only or and his parachuse, as well as the drops Leuenana I only to the drop the success and the success of the su convincing proof of the practicality of the Boards
of delivery will be made of postcards written at the air port,
carried through the air by Eddie Stinson and dropped in a
mail bag at the Atlantic City Post Office where they will be
taken in charge by officials and forwarded by the regular

In checking up on the work of the skyline post as conducted by the United States Postal authorities, W. W. Young, ducted by the United States Postal authorities, W. W. Young, in a lecture pointed out that the air plan was working out on a very business-like laasis. He showed that despite the 50 per central points with the state of the sta of the growing interest and popularity of the air mail service is shown by the fact that the mileage is increasing at the rate of a thousand miles a month.

Lieutenant Edgar Garland, of the Royal Air Force, discussed the developments of aerial mail in New Zealand and Australia, and prophesied a great future for the service. Pilots Gardner and Shank, of the U. S. Aerial Mail Service, related some of their experiences.

Extensive Art Exhibit

The largest are accessioned and continued has been as-sembled on the Soul Feer, a challed City, being and of the Second Pan-American Aeronautic Exhibition and Convention. The twenty official paintings of aerial warfare by Lieu-tenant Charles E. Ruttan, the official painter of the U. S. There is also exhibited the hundred aerial warfare paintings of Lieutenant Henri Farre, the official painter of the French Army and Navy Departments.

American Balloon Progress

The tremendous strides made in dirigible construction dur-The tremendous strides made in dirigible construction during the past few years were cumerated by R. H. Upson, of the Goodyear Company, speaking before the evening session ments worked out in the dirigible industry Jiave been over 2000 per cent," Mr. Upson declared. "The war has helped but the big interest taken by manufacturers in the practical features of the gant bilimp' for commercial purposes has also had considerable to do with the refinements that are now in

"But despite the improvements of the past eight years, the end is not yet in sight—the 'ceiling' of improvements has not even been scraped. Right now the construction of a dirigible of ten million cubic feet hydrogen capacity is under consideration and dirigibles of large carrying capacity, capable of making a speed of over one hundred miles an hour are realities of the near future."

Mr. Upson, who won the International Balloon Race in 1913 and has just returned from Europe, hrought out the possibilities and value of the dirigible for commercial uses. He asserted that Great Britain has outstripped all other nations in dirigible construction, pointing out that where the

(Continued on page 512)

TROPHIES AND PRIZES TO BE COMPETED FOR AT ATLANTIC CITY IN MAY

THE following Trophies and Prizes have been offered for competition at Atlantic City, and from other points to Atlantic City from May 1st to May Jist, All contests are open to Army, Navy, Aerial Mail and civilian aviators.

\$6,000 Curtiss Marine Flying Trophy. Mr. Glenn 11 Curtiss has offered a prize of \$1,000 to go to the first entrant for the Curtiss Marine Flying Trophy who covers the distance of 1,000 miles without stopping. The contest for this prize will open on May 1st, and con-tinue until it has been accomplished.

The entrants who wish to compete for this trophy and prize during the Convention can fly over the 60-mile course between the Steel Pier and Cape May Air Station. This magnificent trophy is exhibited at the

Art Salon on the Steel Pier.

The entrant's record will be counted as a flight for the Curtiss Marine Flying Trophy and \$1,000 under the rules for the 1919 competition for this trophy.

The \$5,000 Pulitzer Trophy, offered for annual competition, to be awarded this year to the aviator who makes the best record in flying land or water plane from anywhere to Atlantic City, and from Atlantic City to anywhere during the month of May.

Competitors for this trophy will start from or end at the Atlantic City Air Port, on Albany Avenue, At-lantic City, which affords unsurpassed facilities for both land and water aeroplanes.

- The Boston Globe Trophy and \$1,750 cash prizes to be awarded as follows: \$1,000 and the trophy to the aviator who makes the best record in flying from At-lantic City to Boston, or from Boston to Atlantic City during the month of May; \$500 and \$2.50 to the aviators who make the second and third best records, respec-Start or ending will be on the Atlantic City Air Port.
- (4) The Cleveland Plain Dealer Trophy and \$1,750 cash prizes to be awarded as follows: \$1,000 and the trophy to the aviator who makes the best record flying from Atlantic City to Cleveland, or from Cleveland to Atlantic City during the month of May; \$500 and \$250 to the aviators who make the best records, respectively. Start or ending will be on the Atlantic City Air Port.
- The Detroit News Trophy and \$1,750 cash prizes to be awarded as follows; \$1,000 and the trophy to the aviator who makes the best record flying from Atlantic City to Detroit, or vice versa, during the month of May; \$500 and \$250 to the aviators who make the best records,

respectively.

Start or ending will be on Atlantic City Air Port.

- The Atlanta Journal \$1,750 prizes, to be awarded to the three aviators who make the best record flying from Atlantic City to Atlanta, Georgia, carrying the Journal. Start or ending will be on Atlantic City Air Port.
- Colonel William A. Bishop's "Ace of Aces Trophy," to be awarded to the aviator who makes the best record in flying from Toronto to Atlantic City, or vice versa,
 - during the month of May. Start or ending will be on Atlantic City Air Port.
- The \$3,000 New York Herald Aero Efficiency Prizes, to be awarded as follows: \$1,000 to the aviator who covers the greatest distance in a tion-stop cross country flight, starting from or ending at Atlantic City between May 1st and May 30th with an aeroplane of any horse-

\$250 to each of the aviators who cover the greatest distance in a non-stop flight from or ending at Atlantic City between May 1st and May 30th with aeroplanes of:

- (a) not over 100 h.p. (b) not less than 100 h.p. and not over 200 h.p. (c) not less than 200 h.p. and not over 400 h.p. (d) not less than 400 h.p. and not over 600 h.p. (e) not less than 600 h.p. and not over 800 h.p. (f) not less than 800 h.p. and not over 1000 h.p.

- (g) not less than 1000 h.p., and over without limit. Start or end of flight will be on Atlantic City Air Port.
- (9) \$2,000 Intercollegiate Seaplane Speed Trophy, for annual competition, to be awarded to the college whose representative makes the best record in flying ten times over a five-kilometer course at Atlantic City each Saturday off the Steel Pier during the month of May. This trophy is to become the property of the college that wins it three years in succession.
- (10) \$2,000 Intercollegiate Aeroplane Trophy, for annual competition, to be awarded to the college whose repre-sentative makes the best record in flying ten times over a live-kilometer course at Atlantic City each Sat-turiaty during the month of May. To be held at the Atlantic City Air Port.

This trophy is to become the property of the college that wins it three years in succession.

(11) \$2,750 Cash Prizes for Intercollegiate Weekly Seaplane Races, offered under the terms of the will of Mr. Samuel H. Valentine. These prizes are to be awarded in connection with the races for the Intercollegiate
Seaplane Trophy described above. They are offered to
assist the collegiate aero clubs and individuals making the entries to defray the expenses connected with en-tering a team. Competing for same will not, therefore, endanger the amateur status of the competitor.

There will be four prizes awarded each Saturday for the best speed made in competition for the annual Inter-collegiate Seaplane Trophy as follows:

First prize	٠.																						\$250
second prize	٠	٠	٠			۰	۰	٠	٠		٠	۰		4	,		۰					4	150
Third Prize	• •				•	٠		,		٠			۰	٠								٠	100
ourth Prize			٠	٠	٠					٠						٠	٠			٠			50

Colleges are permitted to appoint new entries and en-ter different machines for each race. The name of the entrant and type of machine need not be announced until half hour before the race.

(12) S2.750 Cash Prizes for Intercollegiate Weekly Aero-plane Reaco, offered under terms of the will of Mr. Samuel H. Valentine, are the terms of the will of Mr. with the weekly races for the Intercollegiate Aerophane Trophy described above. They are offered to assist the collegiate aero cited hand individuals making the entries to defray the expenses connected with entering a team. Competition for same will not endanger the amateur status of the competitors.

There will, therefore, be four prizes awarded each Saturday for the best speed made in competition for the Annual Intercollegiate Aeroplane Trophy, as follows:

First Prize		 	\$250
Second Pris	re	 	150
Third Prize		 	100

Colleges are permitted to appoint new entries and enter different machines for each race. The name of the entrant and the type of the machine need not be an-nounced until half an hour before the race.

- (13) The Intercollegiate Dirigible Trophy.

 This may not be held until later in the season.

(14) The Intercollegiate Balloon Trophy.

This may not be held until later in the season.

All of these contests, except the intercollegiate, are open to Army, Navy, Marine Corps, intercollegiate and civilian aviators. The rules are similar, so that a com-petitor can compete for more than one trophy in one flight.

- The intercollegiate contests are open to both graduates and undergraduates.
- (15) Open Seaplane Speed Contests (with handicap) for twelve laps of five miles each. To be held on Decora-tion Day. Prizes to be awarded under the terms of the will of Samuel H. Valentine and sanctioned by the Aero Club of America.

First !	Prize													.\$	1,000
Second	Prize.														500
Third	Prize							ì		į					250

(16) Aerial Commuting Prizes

I. To be awarded to entrants who cover the greatest total distance in commuting by air from anywhere to Atlantic City during the period of the Convention,

First	Prize					ı,	 	į			Gold	Medal
											.Silver	
Third	Prize.			ĺ.					i		Bronze	Medal

(Distance to be measured in straight line.)

2. To be awarded to entrants who make the greatest number of trips in commuting by air from anywhere to Atlantic City during the period of the Convention.

First 1	rize	Gold	Medal
Second	l'rize	Silver	Medal
Third	Prize	Bronze	Medal

3. To be awarded to entrants who make the longest flight in commuting from anywhere to Atlantic City during the period of the Convention. (Distance to be measured in straight line.)

First PrizeGold	
Second PrizeSilver	
Third PrizeBronze	Medal

(17) \$2,000 Opening Day Prizes, offered under the terms of the will of Samuel H. Valentine for land aeroplanes and seaplanes. To be awarded to the aviators making the best records in competing for any of the trophies

and prizes on May 1st, flying from Atlantic City to anywhere, and from anywhere to Atlantic City. Competitors starting from Atlantic City will start from the Municipal Air Port at Albany Avenue, Atlantic City. Competitors from other points will end their flights at the Air Port.

(18) \$500 Aerial Runabout Races, offered under the will of Mr. Samuel H. Valentine for speed competition between one-seater aeroplanes of not over 75 h.p. Two races are to be held as follows:

> First race, Saturday, May 10th, at the Atlantic City Air Port, Albany Avenue, Atlantic City:

First Pri	ze		·														ı		\$250
Second P	rize.													٠.			ı		150
Third Pri	ze										ı								100
Fourth P	rize	ı			ı			ı	ì	ì		1				ï	í		50

(19) The Akron Trophy, presented by Major Thomas S. Baldwin, to be presented to the pilot who makes the best time with any type of aircraft in flying from Akron to Atlantic City, or Atlantic City to Akron, during the month of May.

Start or landing must be made on the Atlantic City Air Port.

- (20) \$100 West Point Merchants' Association Prize, to competitor of Pulitzer Trophy who starts from or ends at West Point, Mississippi,
- (21) Woman's Trophy for Flying, offered by Mrs. May Brown-Dietrich, through the Aerial League of America, for competition by women under rules to be drawn by the Contest Committee

DAILY PROGRAM FOR PAN-AMERICAN AERONAUTIC CONVENTION, EXHIBITION AND CONTESTS

SATURDAY, MAY 17TH

AFTERNOON-Aerial races and contests. Illustrated addresses on Aerial Photography.

EVENING-Bail.

SUNDAY, MAY 18TH

AFTERNOON AND EVENING—Illustrated addresses on "Aerial Ex-ploration and the Use of Aircraft for Coast and Geodetic Survey."

MONDAY, MAY 19TH

AFTERNOON—Aidressee on "Need of Broader Attitude Regarding Insurance for Atterati and Aviators,"

EVENING—Hustrated address on "How Army Medical Standards and Tospection Lesson Accidents," Insurance companies and accide

TUESDAY, MAY 20TH

AFTERNOON AND EVENING—Illustrated addresses showing different ways of crossing Atlantic by air and the problems in be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST
AFTERNOON—Aero Safety Day. Discussion al aero safety provisions
made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in flying.
EVENING—"Progress Made in the Art of Pholing Aeroplanes." Distrated.

THURSDAY, MAY 22ND

ATTERNOON AND EVENING-Addresses and discussions of meteorology. "How the Weather Forceass Can Be, Extended and Made More Efficient by the Use of Averatt in Exploring the User too," and "Topographic and Climatic Factors in Relation to Aeronautics."

FRIDAY, MAY 23RD

AFTERNOON AND EVENING-Addresses on "Aerial Jurisprudence-Aerial Laws and Regulations of Air Traffic." (First days, Lawyers, traffic commissioners and police authorities in differconstries invited.

SATURDAY, MAY 24TH

AFTERNOON-Reces and contests.

EVENING-litustrated address on "Need of Establishing Altitude Levels for International, Interstate and Interurban Air Travel."

SUNDAY, MAY 25TH

EVENING-Aeronautic Art Day. Address on "Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paint-ings," by Lieut. Farre, Lieut. Ruttan and others. All prominent artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK

MONDAY, MAY 26TH

EVENING—"Aeronautic Engineering Problems and Their Prospective Solution." Opening of contests for designs and ideas for large aeroplanes.

TUESDAY, MAY 27TH

EVENING "Factors That Increase the Efficiency for Large Dirigi-bles," Advantages of Veneer and Plywood for Aircraft Con-struction."

WEDNESDAY, MAY 28TH

AFTERNOON-Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective Solution."

EVENING-"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON—"Flying Boats Versus Hydroseroplanes for Sport and Transportation."

EVENING—Contest for designs and ideas for large aeroplanes.

FRIDAY, MAY 30TH (Memorial Day)

AFTERNOON-Aircraft contests, EVENING-Reception at the Aeronautic Hall, Steel Pier,

SATURDAY, MAY 31ST

AFTERNOON Aircraft contests.

EVENING—"International Medical Standards for Aviators in War
and P-tte." Reports from different countries illustrated with
attractive films. 30,000 medical men invited.

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING-Award of prizes and diplomas for all



THE NEWS OF THE WEEK



Martin Bomber Covers 650 Miles In 7 Hours 55 Minutes

Washington, D. C., May 8.—A Martin bombing plane carrying four passengers completed a round trip flight from Macon, Ga., to Washington, D. C., and return with a non-stop flight from Washington to Macon. The distance of 650 miles was accomplished in seven hours and fifty-five minutes.

and fifty-five minutes.
The passengers were: Lieut. Colonel T. E. Gillmore, of the Royal Air Force, Major W. H. Frank of the U. S. Air Service, Captain Roy N. Francis, Pilot, and Lieut. F. E. Harmon, second Pilot. The party left Bolling Field, Washington, D. C., for Macon, Ga., Sunday, May 4th. at 1.25 P.M. and arrived at Pinchurst, S. C., at 6.03 Sunday evening, stopping there over night.

From the Peace Treaty

The importance which is now attached to aerial transportation rights and aerial to aerial transportation rights and aerial equipment in the enemy country may be realized by the extracts from the Peace Treaty on the air and aerial navigation: "The armed forces of Germany must

not include any military or naval air forces except for not over one hundred marined seaplanes to be retained till October 1, to search for submarine mines. No dirigible shall be kept. The entire air personnel is to be demobilized within two months, except for 1,000 officers and men retained till October. No aviation grounds or dirigible sheds are to be allowed with-in 150 kilometers of the Rhine or the eastern or southern frontiers, existing in-stallations within these limits to be de-stroyed. The manufacture of aircraft and parts of aircraft is forbidden for six months. All military and naval aero-nantical material under a most exhaustive definition must be surrendered within three months, except for the 100 seaplanes

already specified.

"Aircraft of the Allied and Associated Powers shall have full liberty of passage and landing over and in Germany territory, equal treatment with German planes



Roy Kaabenshue, W. E. Duerstea and Col. W. N. Hensley, Jr., at Wingfoot Lake, Akron Ohio, with the first army dirigible in the hack-

as to use of German airdromes, and with as to the of German airdromes, and with most favored nation planes as to internal commercial traffic in Germany. Germany agrees to accept Allied certificates of na-tionality, airworthiness or competency or license and to apply the convention rela-tive to aerial navigation concluded between the Allied and Associated powers to her own aircraft over her own terri-tory. These rules apply until 1923 unless Germany has since been admitted to the League of Nations or to the above con-

Aerial Sightseeing Service for Yellow-stone Park

The Grand Canyon, Yosemite Valley, Yellowstone National Park, and the Lit-tle Zion Canyon will all be linked in a day's tour by the new airship sightseeing trip, that will be in operation this sum-mer in the intermountain States of the

Rockies Lieut, George C. Beck, chief engineer of the new Utah Motor Cor-poration, is in New York contracting for the purchase of passenger carrying aero-planes to be delivered by July 4. Five Curtiss biplanes from Canada with reach the Utah Company's field at Salt

Lake City this week, and exhibition flights will be made there Memorial Day.

The new corporation is capitalized at \$2,500,000. L. J. Gilmer, a prominent Western automobile manufacturer, and J. C. Kinney, multi-millionaire oil magnate, pany. All the pilots of the ships are

Details of the Transcontinental Flight

Some interesting facts are coming out regarding Major Tom C. Macaulay's re-markable aeroplane flight in doubling the markable aeroplane flight in doubling the continent—San Diego to Jacksonville—Jacksonville to San Diego—although the Major's route was first to the west, Fort Worth to Jacksonville and return, thence east, Fort Worth to Jacksonville and return. The Major's flight was on a course between the 30th and 33rd parallel of latitude. This carried bins from Calfornia, aeross Arizona, about one-third of southacross Arizona, about one-third of south-ern New Mexico, across the entire state of Texas from El Paso to Marshall, then Louisiana, Mississippi, Alabama, Georgia and Florida, in all nine states. This was and Florida, in all nine states. This was the Major's third continental trip, and the flying was done between April 12th and 18th. The total distance, coast to coast and return, was 4.642 miles—flying time 44 hours and 15 minutes.

The eastern flight, on account of favorable air currents was accomplished in 19

hours, 15 minutes. The aeroplane used was a De Havilland Four equipped with Liberty Motors, and carried 60 extra gallons of gasoline and 10 extra gallons lubricating oil. The flight He extra gallons inbricating oil. The night west across Texas was at an elevation under 1,000 feet, and guided wholly by the compass. The trip over the Coast Range Mountains at an elevation of 8,500 feet was uneventful, and San Diego reached without incident. Eastward over the snow-covered coast range an eleva-



in the Hudson River during the Victory Loan Drive

tion of 11,000 feet was attained for the purpose of taking advantage of strong westerly currents. East of Fort Worth conditions were good at 6,000 feet into Souther Field, Georgia, and at 3,000 to Jacksonville, Florida; the return to Fort Worth was without incident. The summary distance and time was as follows:

		Т	ine
		Hrs.	Mms.
Ft, Worth to El Paso		7	15
El Paso to San Diego	704	7	20
San Diego to Ft. Worth.			10
Ft.Worth to Souther Field	852	6	55
Souther Field to Jack- sonville and return to			
Jackson, Miss., to Ft.	812	8	5
Worth	410	4	30
Total	4642	44	15

The Pan-American Commercial Conference, June 2 tn 5, 1919

The governing board of the Pan-American Union, Washington, D. C., having in mind the great present interest in Pan-American trade, believe that much good should result to governments, organiza-tions, firms, and individuals from an informal but comprehensive exchange of views and information between the official and unofficial representatives and experts and others interested in the commercial development of both North and South America.

Among those invited to attend and participate will be the diplomatic, consular and special commercial and financial representatives in the United States of Latin American governments, representatives of Latin American firms and houses, and such unofficial experts as are able to at-tend, officials of the United States Government having to do with Pan-American economic, financial and commercial relations, as well as commercial and trade organizations, firms and houses which are directly interested in Pan-American trade.

The great interest which the Second Pan-American Aeronautical Exhibition, Convention and Race Meet at Atlantic City has aroused with the representatives of the Latin American Republics makes this commercial conference a particularly appropriate place to build up the rapidly

growing trade importance of aeronautical equipment and supplies. The market for aircraft in South and Central America is a very broad one, and it is felt that the aircraft manufacturers will lose no op-portunities to gather information and to cement trade relations which will prove of paramount importance,

Dirigible C-5 tn Attempt Rockaway-Newfoundland Flight

St. John's, N. F., May 10.—The United States Navy dirigible C-5, now at Mon-tauk Point, N. Y., will make a test flight to Newfoundland within a few days, according to officers of the cruiser Chicago, which arrived here from New York, fly-ing the flag of Rear Admiral Spencer S. Wood.

The Chicago came here under spec orders in connection with the dirigible flight, and brought a quantity of equipment, including containers of hydrobe undertaken immediately after the naval flying boats have cleared these waters. has been decided to hold the trial at this time in order to utilize as a patrol the naval ships on duty for the seaplanes.

Two More British Competitors

Captain John Alcock and a party of aviators and mechanics have arrived at Halifax on the Manretania to prepare for an attempt to fly across the Atlantic in a Vickers Vimy machine. Another candidate for the great international ocean-crossing contest by air is Col. John Cyril Porte's immense flying boat, which is entered for the London Daily Mail's \$50,000 prize.

This giant plane, named the Felixstowe Fury, is a Handley Page, built from Col. Porte's own designs.

An Addition to the Sopwith Trans-Atlantic Equipment

A new device-a throat transmitting telephone-has been added by Hawker to the equipment of his trans-Atlantic plane. This telephone makes conversation be-This telephone makes conversation between pilot and navigator easy despite the roar of the motor. The principle is the transmission of the vibrations of the throat by means of a band about it and the shitting out of the engine noises by pernitting the roar to beat with equal

force on both sides of the transmitting diaphragm. It is similar to that used by the American tank soldiers during the war.

Three Navy Seaplanes Made Seven Hun-dred Mile Nnn-Stop During War

Washington, D. C .- Owing to strict military censorship, it was not announced until recently that on Nov. 7, 1918, three navy planes H. S. flying boats left Bay shore, L. 1., for Brunswick, Ga., a distance of approximately 700 miles. The squadron was under the command of Lieut. Harold F. Selden. These three planes arrived in Brunswick twenty hours planes arrived in Brunswick twenty hours later, after stopping for fuel at Cape May, N. J.; Hampton Roads, Va.; Moore-head City, N. C., and Charleston, S. C. The boats were flown by the following The boats were flown by the following officers: Ensigns Paul Storrer, Taylor, Titts and Shanks. This flight was so successful that a second flight was made the cessful that a second flight was made the following week, three other planes leaving Bay Shore for Brunswick. Two of them arrived as successfully as the first three, but one was wrecked on the coast of North Carolina.

The Cleveland Aviation Club

Since the organization of the Cleveland Aviation Club in April, this enterprising body of one hundred and thirty members has obtained five Government planes for flight for the Victory Loan, and is working hard to persuade the city to furnish a municipal landing field. Besides enter-taining Capt. Eddie Rickenbacker at their inaugural banquet at the Hollenden Hotel, they have appointed committees to enter-tain the U. S. Government circus flyers, and to act as hosts for all flyers who may visit Cleveland

Board on Aeronautical Cognizance

Warns Against Flying Without License The Joint Army and Navy Board on Aeronautical Cognizance has found it Aeronautical Cognizance has found in necessary to issue a warning on recent indiscriminate operation of aircraft and the serious dangers entailed in the opera-tion of aircraft by inexperienced filers. The warning was the result of a flight over New York during the parade of the 27th Division in a flying boat at low altitudes

The board points out that there is no way of adequately providing for the public safety where aeroplanes fly at too low an altitude over cities or large assem-blies of persons. In case of accident a pilot would be forced to descend immedipilot would be forced to descend immediately, and human life and property would be endangered to a serious degree. All persons operating civilian aircraft are cautioned against the repetition of an occurrence such as that at New York, and are warned that before engaging in the operation of any aeroplane or balloon they must first secure a license from the Joint Army and Navy Board of Aeronautic Cognizance.

Aviation on the Western Coast

Aviation in California is exceedingly active, and among the interesting demon-strations is a remarkable Sierra Nevada and Rocky Mountain flight, as well as a flight in two Curtiss planes, piloted by Beck, to Ogden, Utah, from Mather Field. The course, which has never before been attempted by aeroplane, covers a distance of over 700 miles. At Mather Field special acrobatic demonstrations have been made for the benefit of some twenty-five thousand spectators, and owing to the been made to Berkeley, San Jose, Santa Cruz, Salinos, Hollister, Oreville, etc.



Chillan delegales to the Second Pan-American Aeronautic Convention. Left to Garfias, General Pinto, Chief of Staff of the Chillan Army; Capt. M. G. Cleary Ewing, Military Attaché to the United States from Chile Left to right:

GLENN H. CURTISS ON THE TRANS-ATLANTIC FLIGHT

HE American N-C Planes will gain nine (9) hours from favorable winds if the average weather conditions for May prevail during the comditions for May prevail during the coning week. Such is the statement of
Glenn H. Curtiss, inventor of the flying
boat, and joint designer and producer
with the U. S. Navy, of the Navy-Curtiss flying boats which are now at Newfound

land ready for the trans-Atlantic take-off. "The conditions governing the trans-oceanic flight," said Mr. Curtiss, "are partly created by the weather and the route chosen, and partly by the flying craft themselves. The Navy has obvi-ously given a long and careful study to both. In my opinion Naval flyers have chosen the best route and are employing a type of seaplane which gives them the

largest possible factor of safety. Advantages of the Azores Route

"There has been a difference of opinion as to whether the Newfoundland-Ireland or the Newfoundland-Azores-Portugal route is the better. The former is more direct. As one who has been interested in trans-Atlantic flight since 1914, howto the southern course. They may be listed as follows:

- 1. It requires a maximum flight withint landing of almost seven hundred miles less than does the northern route. The distance to Flores, the first Azores Island, is only 1200 nautical miles as against 1890 to the Scilly Islands, the nearest point off the Irish
- coast. It avoids the dangerous fog belt which lies to the east and northeast
- of Newfoundland. It is attended by more favorable weather generally,—warmer, clearer, and freer from atmospheric disturb-
- 4. It is in the path of steamer traffic, and hence offers a greater element of safety in case it is necessary to make
- a descent in mid-ocean.

 It is in the path of winds which, under normal circumstances, will increase by 40% the speed of the aeroplanes.

"The N-C planes could doubtless have gone by the northern route. It is shorter than the southern. If the trans-Atlantic voyage were to be admitted a hazard, better indeed to get it over with in the quickest possible time, like a cold shower. But the Navy, I believe, wishes to prove that for the right type of plane the At-lantic trip is not a hazard. The present flight is to be the demonstration of how others like it can be made regularly."

The Problem of Weather

Mr. Curtiss then discussed the question of wind and other atmospheric elements. of wind and other atmospheric elements. The weather conditions for any part of the ocean during a given month are, he pointed out, in the large constant. Over the water lying between Trepassey Bay and the Azores the average winds blow from the northwest. This produces an exceptionally favorable condition, as the flying boats will be blown away from the fog belt (once they are through a small wind zone just off Cape Race) and almost directly toward the Azores. The velocity of these winds, rising so far as an he computed, to 30 miles per hour at 1500 feet elevation, is such that a course plotted to take full advantage of them will being the aircraft to the Azores in alout twenty hours, while if there were dead air the trip would take thirty.

Whether average weather conditions will prevail is a question. British flyers at St. Johns have been waiting over a month for the usual easterly winds, which they expected to find. It is not probable that the Navy boats will wait for ideal conditions, even though ideal conditions may be said to be the norm. They will satisfied with conditions not distinctly

unfavorbale. Other Factors Governing Speed

"But wind," said the flying boat de-signer, "is not the only matter to be con-sidered. It will be interesting to many to know that the speed at which an aeroplane flies is determined by a number of considerations. The N-C boats will not fly as fast as they can, for to fly at top speed would not be economical under the circumstances. Top speed uses up more fuel in proportion to distance covered than certain lower speeds, and in a trip than certain lower speeds, and in a trip like this gasoline and oil must be care-fully conserved. In other words, an economy of energy is necessary for the purpose in view. The flying boats are in a sense like a runner. To start for the Azores at top speed would be somewhat like beginning a mile run with a 100 yard dash. They might draw on their fuel supply to a dangerous point. In

any trip, therefore, where a saving of gasoline is desired, the motor is run at what is called the economic speed. of miles per hour to gasoline consumed may be obtained.

For instance, going at 75 miles an hour might demand a larger consumption of gas in proportion to speed than going at 70 miles an hour.

But the economic speed also varies with

the amount of load carried. For instance, at the beginning of the present trip a speed of 71 miles an hour (regardless of wind) ought to be most efficient. This speed is higher than it would be if 28,500 lbs. did not have to be supported. quently as this weight is reduced by the consumption of oil and gas the economic speed lessens, less power being required to support less weight, and less power resulting in slower forward progress.

Thus if a flight of 30 hours were to be made, the economic speed would have de-creased at the end of the voyage from 71 to 61 miles per hour. This would have followed a decrease in load of 11,000 lbs., the consumption for that period of oil and gasoline. The reduction would have been marked by the shutting off of one of the three motors with which the flying boat had been propelled after its take-off, it being possible to support the aeroplane with two motors after about 6,500 lbs. of gasoline and oil had been consumed, leaving a reserve of two motors during the remainder of the trip.

Prediction Possible Under Certain Conditions

If the speed of the flying boat were determined by wings and motor alone, we could thus estimate scientifically, knowing the load of 28,500 lbs., the position of our aircraft at any stage of the journey. Since the weather is an additional factor, Since the weather is an additional factor, however, we can only guess. With aver-age wind velocity and direction, it should take just 21 hours for the N-C's to reach San Miguel, the Azores island at which they plan to stop unless it is advisable to descend at Flores.

If normal wind conditions should prevail, the boats would have, at the beginvail, the boats would have, at the begin-ning, a flight for three hours against a cross wind. They would fly at 71 mites per hour in order to sustain their load of 28,500 lbs., and would gain from the

(Continued on page 510)



The Trans-Atlantic Boat N.C.-3, equipped with four Liberty motors, and with three tractor propellers and one pusher.

THE START OF THE TRANS-ATLANTIC FLIGHT

By G. DOUGLAS WARDROP

HE navy fliers have made a gallant and successful start. The longest, most difficult, and most dangerous part of their journey still lies ahead, and they may yet find some obstacle in weather conditions such as have held the British fliers so long at St. John's. But all praise to them for their good beginning.

to them for their good beginning.

The three United States Navy flying boats NC-1, NC-3, and NC-4, got away from Rockaway at 10 o'clock on the morning of May 8th. After several days of waiting, commanders and crews were or waiting, commanders and crews were on edge when gray dawn stole in this morning and were early down at the launching ways of the three big flying boats. Before 8 o'clock the "One" and the "Three" were taken out for test lights, and were found fit in every minutest particular. Victualled, fuel minutest particular. Victualled, fuel tanks filled, tuned up to the last minute,

they were ready to go.

The only thing holding back the start was uncertainty as to the weather along the coast to the north. At Rockaway weather conditions were ideal for flying, with a gentle, steady wind out of the northwest which would put it almost at the fliers' backs. And as reports came in from northern points, showing the weather equally favorable all along the route, the impatience of men and commanders to be off became more and more

At length the full weather report from Washington arrived at 9,30 A. M., and Commander Towers, standing among a group of officers, grinned broadly and

"Well, boys, we beat it!" The ensuing half hour was a busy time, with none except those officially attached to the navy permitted near the marine railways or launching ways which held the three big scaplanes. The watching crowd was small, however, consisting of some 500 to 600 attaches of the naval air station and of newspaper men. To this number was added presently a group of women, including the wives of Commander Towers and his brother officers.
Captain Noble E. Irwin, U. S. N., chief of the Bureau of Naval Aviation,

Washington, escorted the women to the station and on arrival excused himself to run forward to the launching ways, wav-ing some small object in his upraised hand. He was laughing as he greeted the naid. He was laughing as he greeted the first man, extending the object to him, "A four-leafed clover," said the man. It was Lieutenant-Commander Richardson, "Gee!"

And he crammed it deep into a well-

protected pocket. Captain Irwin, a "fonr-striper," hustled

along the launching ways, dealing out other four-leafed clovers from his pocket to officers and mechanics of the smiled beatificially, as if certain that now all would be well, and immediately stowed that clover away at the bottom of every-

"Hey, Captain," a voice called out, as Captain Irwin was about to turn away. "don't forget 'Smoke'!"

The captain faced about and at the sound of his name being shouted, "Smoke" Rhodes, mechanic of the NC-4, looked up from his occupation of tinkering with something in the cockpit of the big boat, and peered over the edge, fif-teen feet above Captain Irwin's head. With a wave of the hand, the captain to climb up and "Smoke" stretched a greasy hand down to meet him. He took the extended clover, and then the captain gripped his hand, grease and all, and shook it heartily.

At this sign of comradeship between "four striper" and mechanic, the sailors ashore let out a cheer.

asnore tet out a cheer.

And now the hour to start had come.
The three boats were poised on the
launching ways, bodies of battleshing gray,
wings yellow. Every man was in his
place. Each boat held its crew of six,
with an additional man to be carried as
ar as Newfoundland in order that minor mechanical difficulties which might occur in the first part of the trip could be quickly remedied, and also in case of any sickness developing among the regular

The men obviously were laboring under great nervous excitement as they settled in their places, adjusting over their heads in their places, adjusting over their heads the instruments of the wireless telephone with which they could communicate with each other. The pilots gripped the wheels. The crowd stood clear. With a tremendous roar, the four big Liberty, motors of the NC-3, Commander

Towers' craft, began turning over. hoat leaped down the launching way like a thing alive and slid far out into the water. It was 9.57.

Another roar, the NC-4 was on her

way, 9.58. Another roar, the NC-I was off, 9.59.

For a few breathless minutes the boats "Three" suddenly soared upward. One minute later to the second the "Four" fol-

minute later to the second the "Four" fol-lowed in the air. And another precise minute behind rose the "One." There was little cheering. Everybody was too busy watching and thinking of what the start of the flight portended, perhaps, to give vent to his feelings.

npon, the few spectators were assembled. Besides Commander Irwin, Commander A. K. Atkins, head of the aviation sec-

American and British Planes Ready for Ocean Flight

St. John's, N. F., May 14.—The American NC-1 and NC-3 planes are ready to attempt the ttransatlantic flight as soon as the storm area over the mid-Atlantic disappears. The NC-4 the storm area over the mid-Allantic disappears. The NU-4 is expected daily from Chatham, Mass, where she was forced to descend on account of engine trouble encountered on the first leg of the flight from Rockaway Naval Air Station. Unfavorable weather conditions have prevented the NU-4 from regioning the NU-1 and NU-2 at Trepassey Bay.

from rejoining the NC-1 and NC-3 at Trejassey pay.
According to press dispatches, it is considered likely that the
NC-4 will attempt to fly to Trepassey Bay from Chaltam in
one flight. It is considered improbable that the NC-1 and
NC-3 will wait for the NC-4, and hence every effort is being

strained to reach Newfoundland before the start of the remainder of the fleet.

remainder of the fleet. Two avaidant parties contemplating a transatlantic flight in Bolton and Paul and Vickers-Vinny aeroplanes, both of British make reached here on May 13. While Messrs. Hawker and Raynham, pioneer flyers at this "hopping off" place, studied weather charts which indicated continuance of unfavorable conditions which have held them landbound for more than a month. Capital U.S. Beunett began an inspection of a tuan a month. Captain U. S. Bennett began an inspection of a possible site for the Bolton and Paul three seater, while Cap-tain A. A. Alicott and A. W. Brown conducted negotiations for the housing of their Vimy machine.



The NC-1, first of the NC flying boats built for the Navy's attempt to fly across the Atlantic

tion of the Bureau of Steam Engineer-ing, which is responsible for the power plants of the planes, also came on from Washington.

Glenn H. Curtiss, builder of the planes; commander G. C. Westervelt, who had Glenn H. Curtiss, builder of the planes; Commander G. C. Westervelt, who had much to do with the construction of the hulls of the ships; G. Douglas Wardrop, managing editor of Arrial Acr; Mrs. Richardson, write of Commander H. C. Richardson, pilot on the NC-3, and her little daughter Margaret Jane; Mrs. 1da Harding, aunt of Lieut. Barin, pilot on the NC-1, and Lieut. Commander George R. Murray, commandant of the naval avi-K. Aurray, commandant of the naval avi-ation station at Anacosta, D. C.; Dr. Charles Olmstead, designer of the pro-pellers used by the seaplanes, and Her-bert Satterlee, formerly Assistant Secre-tary of the Navy, and Mrs. Satterlee,

were present.

also were present.
When the planes leave for the Azores, 1,200 nautical miles distant from the starting point at Trepaseve Bay, Newfoundland, they each will weigh 28,000 pounds, for they will carry two tons more of gasoline than they did on their first hop. In addition, instead of seven men the flagship of Commander Towers will carry only five, who, besides the commander, will be Commander Richardsou and Lieut. David H. McCullough, pilots; Lieutenant-Commander R. A. Lavender, radio operator, and Machinist L. R. Moore. Lieutenant-Commander R. E. Byrd, who was on board yesterday to conduct special navigational experiments, and Lieut. B. Rhodes, reserve pilot engineer, will be dropped at Newfoundland

Lieut. J. L. Breese will quit the crew of the NC-4 at Newfoundland, leaving it composed of Lieutenant-Commander A. C. Read, commander and navigator; Lieuts. E. F. Stone and Walter Hinton, pilots; Ensign H. C. Rodd, radio oper-ator, and Chief Machinist's Mate E. S. Rhodes.

From the crew of the NC-1 Machinist From the crew of the NC-1 Machinists, R. Christensen will be eliminated, leaving Lieutenant-Commander Bellinger, navigator; Lieutenant-Commander M. A. Mitscher and Lieut, L. T. Barin, pilots: Lieut, H. Sadenwater, radio operator, and Chief Machinist's Mate C. I. Keslef, engineer, to make the next leg in the journey,

The Personnel of the Expedition

The Personnel of the Expedition Commander John Henry Towers is in com-mand of the division of three NC flying boals time when the officers of the navy thought a man was ruining his career to take up with what many thought was only a dangerous toy, and any thought was only a dangerous toy, and velopment of aviation in the navy. A happen-gin his early career is told as characteristic

of the man. In 1910, just after be had become a student in availation, for stud Emisgue miles of the primitive type of those days, with a bambout had been assumed to the primitive type of those days, with a bambout and the machine saven, ever with such velocity that both men were through from their sestia fell to his death. Inverse managed to cately had of a strut and held to this in the decent toward or a strut and held to this in the decent toward water, the wind caught it and it leveled off. This brake the fall and saved Tower's life.

on a ware aith root to this in the accessed toward water, the write caught it and it leveled of water, the write caught it and it leveled of water in the course of the next year the navy made a desired sunt in the development of part, N. Y., where a rangements had been made with Green H. Currist to bindly bee fring beats with Green H. Currist to bindly bee fring beats of the course of the part of the course of the cour

"As commander of NC scaplanes Division 1, of regularly commissioned scaplanes, his status will be the same as of scapoling ships of the navy." Commander Towers is a Georgian, 34 years old. He was graduated from the Naval Acad-my in 1906. He is married and has a daughter.

With Towers on NC-3

With Towers an NC-3 In describing the personnel of each of the sea of the personnel of each of the sea of the personnel of each of the sea of the personnel of the feet of the personnel of the feet of the personnel of the feet of the personnel of the personnel of the feet of the personnel of the

apparatus in use, and mechanicians with rare structure are users, and mechanicians with rare structure are users, and mechanicians with rare structure are users, and the cross logistics. With the exception of the evolution, and the cross logistics, with the exception of the evolution, and the extraction of the evolution of the

the water hold his grams were broken. Chewsher when they strick the water.

"As if you ran into a stone wall when going at The caption of the property of the



The NC-4, which was delayed at Chatham, Masa., owing to motor trouble experienced in the first leg of the trans-Atlantic flight

Royal, Penn, in 1800, and restered the Naval Reserves in October, 1917. McCollich is known machines he has been a client care plate for the machines he has been a client care plate for the Naval in Naval Pennsylvania (Naval Pennsylvania) and the second of the Naval in Naval Pennsylvania (Naval Pennsylvania) and the makes of motors like a book, and after several pennsylvania (Naval Pennsylvania) and the makes of motors like a book, and after several pennsylvania (Naval Pennsylvania) and the makes of motors like a book, and after several pennsylvania (Naval Pennsylvania (Naval Pennsylvania) and the makes of motors like a book, and after several pennsylvania (Naval Pennsylvania (N

Moore was born in Grand Island, Neb., in 1892 and won his appointment as boatswain in May, 1918.

May, 1916.

Filters on NC-I N. Bellinger, Commission Pierre N. L. Bellinger, In 1910 the commission for turrer that awarder. Before that he had specialized in game-ranger, In 1910 the commission for turrer that matter sought opportunity with the submariner. Such as the commission of the

plante from the decx of the ships by means of the plante from the decx of the ships by means of the ships by mean of the ships by mean

physique, bringh of medium beight, and will have his pick, even at the most titidish times. It is a South Cardinain, born at Chern's in 1904, and it material.

Next in No. 1 is Liest, Camming March 2 in 1904, and it materied.

Next in No. 1 is Liest, Camming March 2 in 1904, and it materied.

Next in No. 1 is Liest, Camming March 2 in 1904, and it materied. So that the control of the barried with the control of the Nixel Art Station at Reckways. At Station at Reckways. At Station at Manni, Flan, one of the barried with the war. It is combined recent as a piles and are received under the war. It is combined recent as a piles and the station of the largest the war. It is combined recent as a piles and the station of the largest the war. It is combined recent as a piles and the station of the largest the war. It is combined recent as a piles and the largest the war. It is combined recent as a piles and the largest the war, the combined recent as a piles and the largest the war, the combined recent as a pile and the piles of the largest the war, the combined recent as a pile and the piles of the p

1917. Lientenant Harry Sadenwater, radio officer for Seplane No. 1, has had unusual experience with the direction finder. Before he joined the Naval and the direction finder. Before he joined the Naval and was also radio inspector, for the Department of the Control was also radio in the control of the Department of the Control was also radio in the control of the Department of the Control was also received by the disputed the radio apparatus on every hip of importance coming into New York. Lieutenant Sadenwater was born in Machinia Bassan Children and Control of the Con

Brooklyn in 1894.

Machinist Rasmus Christiansen and Chief Machinist's Mate C. I. Kealer, mechanicians for No. I, are sobth skilled in the highest degree and the state of the

On the Seaplane N. C.-4

On the Sospiane N. C.-4
Scapine, No. 4, the craft which alighted off
Scapine, No. 4, the craft which right of ConItalian Control of Control
Italian Control

won a place as one of the best pilots, but also as an administrator in the aviation division.

Commander Read was born in New Hampshire in 1887 and appointed a midshipman from Mas-sachusetts in 1903. He is married and has one shild, a boy. He is a small man, quiet and

observing.
First Liceureant Elmer P, Stone, pilor and
contraction, belongs to the United States Costs
regularized to the United States Costs
organization. His skill and daring when the
war placed a greater persaure on the Navy Jed
and Repair as a test pilor for new machines, and
the record he made won him a place in the transyork in 1837 and appointed to the United States
Costs Guard Academy from Norfolk, Va., from
which he was groutsteff in 1907.

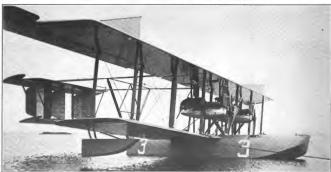
wence ne was graduated in 1910. Lientenant Water Histon, pilot, was an enlisted man who became an ensign in March, 1918, and on account of his skill as an aviator was designated as one of the pilots of the fiving boat H-16 in its flight from Rockaway Beach to Hampton Roads last January. Hinton was born in Ohio and is 31 years old,

and is 31 years old.

Livoteant Janes L. Breeze, engineer, the not man in No. 4, is from the floreau of Steme not man in No. 4, is from the floreau of Steme he errord as 2 sets pilot for experimental machines and was also engaged in the development of power pilot necessaries and apparatus of proper pilot necessaries and apparatus of the pilot of the pilo the erews had previous thorough contact with the the erews had previous thorough contact with the problems that would confront him on an ocean flight. Lientenant Breeze is a member of the Naval Reserves, which he entered as an ensign in November, 1917. He was born at Newport, R. I., and is 34 years old.

Ensign Herbert C. Rodd, radio officer for No.
4. assisted in the development of the radio
compass used on the three seaplanes. Before he
joined the United States Naval reserves in
August, 1918, Ensign Rodd served as radio operator on the Great Lakes. He was born in
Cleveland, Ohio, in 1894.

Cleveland, Ohio, in 1894,
In the original assignment of the crew of No.
4, E. H. Howard, United States Naval Reserve
4, E. H. Howard, United States Naval Reserve
4, E. H. Howard, United States Naval Reserve
4, E. H. Howard, Lint the accident
5 which Howard of the left hand removed him by
which Howard of the left hand removed him
by which Howard of the high chand removed him
place. Rhonders is serving for the second time in
the Navy, which he eutered as a ceal passer, and
is known as one of the best enginemen in the
2 work of the control of 28 years old



The N. C.-3, flagship of the Navy's trans-Atlantic flying boat flotilla, is under the command of Commander John H. Towers

FINDING AIRCRAFT LANDING STATIONS BY MEANS OF AUDIO FREQUENCY RECEIVERS

Address Delivered at the Second Pan-American Aeronautic Convention
By EARL C. HANSON

Expert Radio Aide, Bureau of Steam Engineering, Navy Department

ONE of the most important problems confronting the successful future of commercial aerial navigation is the development of a practical means for the landing of aircraft with absolute safety in darkness and the densest fog. The purpose of birnigning forth the following plan is to increase the safety in aviation and thus contribute to the advancement of this

At present unless atmospheric conditions permit a clear vision of the field

N., head of the Radio Division of the Bureau of Steam Engineering, this new application of radio has progressed far beyond anything realized by the public. The properties of the public of the public



Earl C. Hanson, radio engineer, Bureau of Steam Engineering, who is a pioneer in the development of radio telephone communication for moving trains, and the inventor of a system of wireless audio beacons for aero landing fields

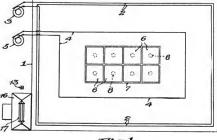


Fig.1.

from a considerable distance and altitude, the bringing of aircraft to carth a the spot chosen is uncertaint on hazardous At night, sen with the use of powers of sarchlights, successful landings are exceedingly difficult. With this in mind we must now seek means of overcoming this difficults.

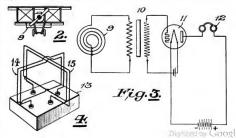
difficulty

The Air Depot or landing station proposed is shown diagrammatically in Figure 1, 2, 3 and 4. It comprises broadly mission system to guide the aircraft at high speed in a direct course between separated cities or other point, audio in the control of the control of

Before discussing the complete system it would be well to consider the development of the radio compass. Under the direction of Captain S. C. Hooper, U. S. equipped with this marvelous radio compass and shore compass stations are rapidly being constructed at the entrances of our principal harbors from which navigators may obtain bearings, although their ships may be enveloped in heavy fog. We are now ready to consider the may be are now ready to consider the payication of the radio compass to acrial navication.

The proposed "Air Port" can be more readily understood by reference to the drawings. Referring particularly to Figure 1, the numeral 1 indicates the landing field of the Aircraft Station con-

attutted preferably of solid material securately leveled and equipped with deainsage systems. 2 represents a plurality of insulated electric conductors tootted at the outer edges of the field and concurrent 3.4 indicates a second bop of insulated electric conductors positioned enearer the center of the landing field and current source 5. Within loop 4 and at the center of the field in the control of the supported in a sittable framework 7. The illuminated zone is level with the surface of the field. Breath sections 6 surface of the field.



there are placed suitable lighting means 8 such that the entire translucem zone is rendered visible at a considerable altitude.

Figure 4 shows the radio compass sig nalling station represented by numeral 13 in Figure 1. The signalling apparatus is enclosed in casing 13, which may be of the usual form of radio frequency directive transmitting apparatus and is pro-vided with coils 14 and 15 arranged at 90° to each other and positioned in vertical planes. The coils are arranged in predetermined directive lines such that signals transmitted will be propagated in line with the course of the aircraft between communicating stations in separated cities.

Figure 2 indicates an acroplane provided with a looped conductor 9 connected to audio frequency responsive ap-paratus contained on the aeroplane. This audio frequency responsive apparatus is of the type using the well-known vacuum tube andio frequency amplifier and is in addition to the radio frequency apparatus. The radio frequency apparatus is em-ployed only in guiding the aircraft in their course between the communicating

stations

Figure 3 shows the wiring diagram of one form of audio frequency apparatus adapted to be installed on the aircraft. The looped conductor 9 is connected to the terminals of the primary of an iron core transformer 10, the secondary of which is directly connected in circuit with the usual form of thermo-ionic tube amplifier 11 having the customary plate cir-cuit with recording telephone 12. The circuit disclosed permits response to audio frequencies projected upward from the loops 2 and 4 at the landing field.

In the operation of the present landing station loops 2 and 4 are supplied with eurrents of different audio frequencies having different degrees of strength such that electro-magnetic energy will be pro-jected upwards from loop 2 at high fre-quency and with relatively great strength, quency and with relatively great strength, while energy projected from long 4 will have a lower frequency and will be of weaker; iterability. This combination of weaker in the strength of th example, the aviator wearing telephone receivers 12 within a helmet hears at a high elevation the audio frequency signal nigh elevation the audio requiency signal projected from loop 2 having a charactristic note and inon further descent comes within the field of energy projected upward by loop 4 having a different characteristic sound. As pre-



music transmitter installed Walter Reed Hospital, Washington, D. C., the invention of Mr. E. C. Hanson. It sends music to all wards of the hospital, but is audible only to patients wishing to listen

viously mentioned, the audio frequency energy could actuate visible indicators placed conveniently before the pilot. Reference character 13 designates

radio compass signalling station located within the limits of the landing station. The landing station is also provided

with hangars, oil and gas service depart-ment, comfort facilities, a cafe, telephone booth, long distance radio telephone and telegraph installations. The radio antelegraph installations. The radio anbuilding 16.

The future success of commercial aerial transportation now awaits the establishment by municipalities the type of air-craft landing station presented. The adoption of the proposed aircraft landing station together with strict regu-

lations of aerial highways will result in the rapid development of this science and



By attaching this receiver to his bed-spring the wounded soldier at Walter Reed Hospital is able to hear the music or words transmitted by the electrostatic phonograph

Benzol for Engine Fuel

The Committee of the National Benzol Association has issued the following specification for benzol for use as engine fuel:

(1) Specific gravity, 0.870 to 0.885.

(2) Distillation test (by flask): Benzol shall give a distillate of not less

Benzol shall give a distillate of not less than 75 to 80 per cent at 100 deg. C. Benzol shall give a distillate of not less than 90 per cent at 120 deg. C. Benzol shall give a distillate of not less than 100 per cent at 125 deg. C.

(3) Sulphur shall not exceed 0.40 per

(4) Benzol shall be entirely free from

water.

(5) Color shall be water white.

(6) Rectification test: 90 c.c. of the sample shaken with 10 c.c. of 90 per cent sulphuric acid for 5 min. should not give more than a light brown color to the acid

(7) Benzol shall be entirely free from acids, alkalis and sulphuretted hydrogen, (8) Benzol shall not freeze at 25 deg. Fahr, below the freezing point of water.

Such a specification should insure general freedom from trouble with this fuel. The tendency which pure benzol has to freeze readily is amply provided against, and this is a good point. The negligible amount of sulphur allowed is also satisfactory, as with it no cylinder corrosion is likely to occur.

-Motor (London).

Book! Review

ELEMENTARY AERONAUTICS, or The Sci-ence and Practice of Aerial Machines. Compiled by Albert P. Thurston, B. Sc. 126 illustrations.

The author has been persuaded to pub-lish this work in the hope that it may be useful in leading others to the scientific study of aeronautics. The aim of the author, therefore, has been to present to the reader a simple and concise account of the action of air upon moving planes, acrocurves, propellers, bars and the like, and the application of these principles to practice.

The theory of the normal and inclined plane and aerocurve is dealt with in Chap-ters I and IL

An introduction to the important prob-lem of stability has been given in Chap-ters III and IV. The theories and results deduced in Chapters III and IV appear largely to have been confirmed by various experimenters and scientists since these conclusions were arrived at.

The theory of the propeller and helicop-

ter and the calculations relating to the ter and the calculations relating to the design of a flying machine are set out in Chapters V, VI and VII. The principal instruments and apparatus used in an aeronautical laboratory are described in Chapter VIII, and the rest of the book is devoted to a description of the chief

types of flying machines and engines.

Chapter I. Normal and Inclined Planes: Chapter II, Aerocurves; Chapter III, Automatic Longitudinal Stability and Manual and Automatic Control; Chapter IV, Auand Automatic Control; Chapter IV, Au-tomatic Lateral Stability; Chapter V, Pro-pellers; Chapter VI, Helicopters; Chapter VI, Calculations Relating to the Design value of the Control of the Control ratory Instrument and Apparatus; Chap-er IX, Types of Machines; Chapter X, Engines. This publication can be pur-chased at The Aeronautic Library. Inc., 299 Madison Avenue, New York City, at the price of S1275 poet paid.

THE O. W. TIMM MODEL T-18 TRACTOR

Suan upper plane



THE T-18, designed and built by O. W. Timm, Venice, Cal., is one of the latest types of two-place advance training and sport planes. It has a high safety factor to withstand the severe strains of stunt flying and rough landing. Dual controls are installed.

Tanks contain 40 gallons of gasoline and 5 gallons of oil, which is sufficient for a flight lasting about four hours.

General Dimensions

14' 0"

	pan, upper	prane					. ++ 0		
5	pan, lower	plane					.36' 0"		
0	hord, upper	plane					. 5' 0"		
(hord lower	plane					3' 6"		
-	ap between	olanes					. 5' 0"		
č	verall length	pinine si					25' 0"		
č	verall heigh						0' 6"		
	veran neign						. > 0		
			-	treas			(sq. ft.)		
1	pper planes						180		
ì	ower planes						118		
7	ilerons						40		
- 5	tabilizer						13.5		
	levators								
	in								
Н	udder						10		
							pound		
L	oading per s	square	foot				5.63		
				oights			pounds		
	et weight (empty)					988		
•	ross weight	(fully	load	ed)			1903		
ι	seful load .						915		
1	oading per s	a. ft					. 5.63		
		4							
Maximum speed									
7	linimum sper	ed				38	M.P.H.		
C	limb in 10 m	inutes.				7.6	00 feet		
H	ange of end	urance.				4	hours		

Main Plenes

Incidence angle of both planes 2.5 degrees. Main planes are

in five sections. Clearance between the sections is 34". Upper plane has no dihedral; lower plane 2½ degrees dihedral.

Kiba are designed from U. S. A. No. 1 data, and are built with 5/32 " 3-ply white poplar wels and 5/32" by %" spruce battens. Beams are of 1 section, spruce. Allerons attached to the upper plane are 12' long and have a chord of 20". They are constructed entirely of steel tubing. Main members 14%" 18 gar, phs 5/10" 20 gar.

Fuselage

Length overall, 19' 10"; width, 27"; depth, 36".
The fuselage is built in two sections, being detachable directly back of the rear seat. Front section is built up of ash, channeled for lightness. Longerons are laminated.

Rear sections is of spruce.

Engine mounting is a steel stamping. Complete power plant can be removed in less than twenty minutes by removing 8 can be removed in less than twenty minutes by removing 8 bolts and the gasoline line connection.

Landing gear is of the V type. Ackerman wheels, with 26" by 4" tires.

Tail Group

Tail group is built entirely of steel tubing, and is as light as wood and much stronger. No wires or braces are used. Stabilizer planes are built in two sections, and the angle of incidence is adjustable.

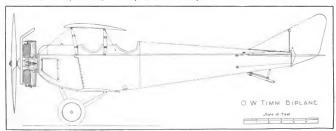
Overall width of stabilizer planes, 8'10"; overall depth, 3'4"; overall width of elevator, 10'9"; overall depth, 3"; overall width of overall width of vowerall weeks.

Engine

The O. W. T. engine is a six-cylinder radial type air-cooled, rated 125 H. P. at 1475 R. P.M. Bore 5', stroke, 6'. The weight, complete ready to run is 325 lbs.
Cylinders are machined from solid steel forgings. Cylinder heads are of semi-steel castings, and are screwed and welded

into the cylinders. Each cylinder is attached to the crankcase by means of 8 studs.

Pistons are of cast iron. The heads are flat, and well webed for strength and cooling. Three double seal rings are used on each piston.



Side elevation of the Otto W. Timm Tractor, with an O. W. Timm H.P. radial engine

A double throw counterbalanced crankshaft of chrome nickel steel is used.

Connecting rods of chrome nickel steel. They are round, of constant section, and hollowed for lightness. They are machined all over. Bearings of bronze, babbit lined with steel retainers. Wrist pins of nickel steel and float in the rods.

One cam shaft with two cams operate all the valves.

push rods have ball and socket ends, and are adjustable. Valves are of tungsten steel. Two exhaust valves 115/16" in diameter and one intake valve 24\section in diameter to each cyl. Two magnetoes and a 2" Miller carbureter are used. A special type of oil distributor working under a constant pressure of 20 to 40 pounds, and timed with the pistons supplies the engine with the correct amount of oil at all speeds.



he O. W. Timm Model 18 Tractor, which has speed range of 38-97 p.b. with an O. W. T. cylinder 128 H.P. radial engine

TWO SIMPLE TESTS FOR INSPECTION OF AEROPLANE STRUTS

I N the field of testing, sleuder struts are unique. No other structural members can be tested to maximum load without injury, nor will they permit of the securing of data for an accurate computation of the maximum load, but data for an accurate computation of the maximum load, but with slender struts either of these things can be done very simply. The following two methods have been developed and verified by the Forest Products Laboratory as of practical application in strut inspection.

The strut may be loaded as such, increasing the load graduand struit may be losted as Such, increasing the load graduitally till the maximum is reached—that is, until the load ceases to increase with increasing deflection. Repeated experiments on Sitka spruce and Douglas fir aerophane strus of various patterns have shown that, if stopped at this point, the test does not injure the strut, provided the shenderness ratio (L/r) is 100 or more. The accompanying sketch illustrates a simple machine by which struts may be tested in this way at the rate of 100 or more an hour.

Simple Strut Testing Machine

. The strut S is supported on knife edges. The load is applied by a handscrew H and is measured by a dynamometer D. The screw is turned until the pointer of the dynamometer ceases to move; the load then recorded is the maximum load of the strm.

Second Method of Test

The strut is tested as a beam. It is supported by a knife-edge at either end and loaded in the middle, one knife-edge being placed on a platform scale to measure the reaction. The reaction R and corresponding deflection are carefully measured for one or more loads (safely within the elastic limit). The ratio

$$\frac{R}{I} = p$$
.

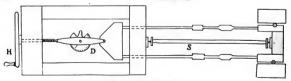
which is constant up to the elastic limit, may now be substituted in the formula.

$$Q = 0.206 \quad \frac{l^{4}}{L^{2}} p$$
where $l = \text{span used in beam test}$

L = effective length of strut

Q = Euler or maximum load of the strut as such (pin-end conditions).

Numerous tests on Sitka spruce and Douglas fir struts have proved that this method can be relied upon to give the maxi-mum load to within about 5 per cent, of the correct value for struts which have a slenderness ratio of 100 or more, and are uniform in cross-section or tapered not too severely.— Technical Notes of the First Products Laboratory, U. S. Forest Service.



Simple strut testing machine

THE SUNBEAM AIRSHIP ENGINE

THE Sunbeam Company carried out

THE Sunbram Company carried out the supply and manufacture and extensive the Paritah Airship R-33 and R-34. This machinery comprises in adequate the Paritah Airship R-33 and R-34. This machinery comprises in adequate the Paritah R-34 and Parita camshafts to each row of cylinders, the camshaft drive being by a train of gears

The articulated system is adopted for the connecting rods and a flywheel is firthe connecting rods and a flywheel is threed to the crankshaft. These engines are designed to run at 2100 revolutions per minute, the B.H.P. at this speed being 275.

Carburetors, of which there are four, are of the Claudel Hobson B.Z.S. 38 type, and are fitted outside the "V", petrol being fed to them either by gravity or by pressure. The ignition is by two 12 cyl-inder magnetos.

The water pump is of specially large dimensions and a governor is fitted so that when the engine speed reaches 2500 r.p.m., or when the oil pressure falls below 20 lbs. per square inch, the ignition is cut off.

is cut off.

A hand starter and compressed air starter are provided. The exhaust pipes are provided with a special arrangement for cooling by water. The flywheel carries one element of a fiction clutch. This element is driven from the flywheel by means of a series of composite leather and brass driving pieces which are interposed to equalize the stresses on the teath

of the main wheels. The clutch itself is of the multiple disc type with a single central spring and contains a series of ten phosphor bronze plates of special alloy phosphor bronze plates of special alloy making frictional contact with ten similar plates of steel. The central spring is operated by a lever on the control station in connection with the engine through a pair of collars fitted with an eccentric link in such a way that the pressure of the spring is balanced when driving, and the end load on the crankshaft is reduced to a minimum when declutching.

From the clutch the power is led by

a dog coupling for permanent disengagea dog coupling for permanent disengage-ment when necessary, to a gear box fitted to the after end of each gondola. The gear boxes are of three types. In the forward gondola the gear box is a plain reduction type without reverse gear, re-ducing the speed from the crankshaft, revolutions of 2100 to 540 per minute.

revolutions of 2100 to 540 per minute.

The second gear box is of reversing type and is used on the wing cars, and gives similar reduction, but allows by means of sliding gears for the direction of rotation of the propeller to be changed for manocuvring purposes.
(Continued on page 510)



The Sunbeam "Maori 4" 275 H.P., with which the British Dirigible R-34 is equipped

THE 400 H.P. FIAT AERO ENGINE

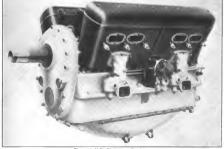
THE latest type of aviation engine to be produced by the Fiat Company is a particularly interesting 12-cylinder developing 400 horsepower. In this new engine the designers have succeeded in obtaining very complete accessibility, in getting a reduced overall area, and a very low weight per horsepower.

The cylinders, which have a bore of 120 mm, and a stroke of 150 mm., are of steel, with a common water jacket for each group of six. The valves are placed in the cylinder head, but are covered by a metal housing which prevents any oil leakage. Operation of the overhead camshafts is by means of a vertical shaft and bevel gearing for each group of cylinders. bevel gearing for each group of cylinders. There are four carbureters, carried on the outside of the cylinders. Equal accessi-bility is obtained for the magnetos by driving them from a central cross shaft, each magneto thus being placed between two carbureters. With this design the mechanics have complete accessibility, merely by the removal of the engine housing, to the carbureters, the plugs, and the magnetos, the only parts likely to require frequent attention

The propeller is the geared-down type, with a ratio of 1 to 1.51, and for war purposes was designed for a gun to be fired through it. Normal engine speed is 2,300 revolutions, at which speed 400 h.p. is developed. At the maximum engine speed

of 2,500 revolutions the power is 450. Weight of the engine empty, 770 pounds; weight with cooling water, 826 pounds; weight with all on, 890 pounds. Weight per horsepower, with water and radiator.

1.9 pounds. The engine has a fuel consumption guaranteed of 8.4 ounces per horsepower-hour, and a minimum consumption of 7.7 ounces per horsepower-



The 400 H.P. Flat Aero Engine

THE PRINCIPLES OF AEROPLANE CONSTRUCTION

By CAPTAIN JAMES VERNON MARTIN

(Continued from page 450)

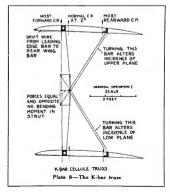
*HE types of single truss which have been tested are quite numerous (see Plate 7) and the fact of their discard proves that most of them have disadvantages in excess of their promise. The first single truss to prove practicable

of their promise. The first single truss to prove practicable was the Breguet tractor bipline single strut up of 1911, which utilized flat steel springs to hold the ribs and wings in constant relation to the plane of the fuselage. It was found that after use and exposure to varying temperatures the springs varied so much to mipari the efficiency of the aeroplane through lack of miformity in the angle of incidence, in a rigid way was treel by Mr. Sigrist of the Solywith concern in England (Fig. 2, Plate 7), shows a semicircular are passing through the strut and arranged so the incidence could be varied with cose, but practice showed this construction to be week in introducing bending movements into the strut and in falling to provide sufficient rigidity to care for retwent movements of the center of present could retrieved. rearward inovements of the center of pressure. Another dis-advantage was found in the excessive structural resistance of the arc. A modification of this structure was the elim-ination of the forward portion of the arc, which lessened the structural resistance but retained the other disadvantages.

the structural resistance but retained the other disadvantages. One of the most promising of the single truss view Instead to the control of the strut at the ends.

Fig. 5 shows a form of single truss approved by certain officials of the U. S. Navy. This form provides a rigid wing structure without introducing bending moments into the strut structure without introducing beduning moments into the structure and also provides a ready means (by turning the tension rods) of varying the incidence of the planes. It is proposed to further reduce the structural resistance of this truss by paneling in the rods with the strut (Fig. 6, Plate 7) but to this would seriously interfere with both vision and stability.

I have urged upon our authorities the substitution of the K-bar cellule truss (Plate 8) since it answers all the require-Repart centure trust (Factor) since it answers an interceptive ments without attendant idsolvantages. It provides a rigid wing structure without introducing bending moments into the strut, since a rearward center of pressure movement causing a compression in the har bwild cause an almost equal tension in bar a, but the horizontal components of these forces neutralize each other in the bolt and only the sum of their ver-



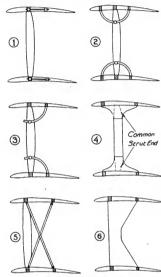


Plate 7-Various single lift trusses

tical components is introduced into the strut. This is a most desirable feature because the lack of vertical dimension most desirable feature because the lack of vertical dimension in the average rear wins har renders it relatively incompetent to resist multiple hit stress, especially since it has the task of resisting practically all of the drift stress in competent to resist normalization of the drift stress in the contract the lift stress of the cellule about the central wing har and the drift stress can be entirely trussed from the leading the error to the contract of the contract which have been contracted as the contract of the drift stress through the rits as in the double truss type. By use of the K-har truss we address an open contract the contract of th

Comparison of Resistance and Weight of K-Bar and Double Lift Trusa Systems

At a speed of 100 m.p.h., Wing loading of No. 9 sq. ft., Safety factor of 8,

Aspect ratio of six, Gap/chord ratio of K-bar Truss-1.143, Gap/chord ratio of double lift Truss-1.

Resistance of K-bar Truss is $\frac{97.2}{185.0}$ = 52.5% of resistance of Double Lift Truss.

146.57 = 72.7% weight of Double Weight of K-bar Truss is Lift Truss.

Resistance and Weight of K-Bar Truss System

Member	ize	Lgth.	Area (eq.ft.)	Kx.	No.	Rx. 5	W1. =
(Wires)		141	***	.0026	-	25.4	19.1
Inner Panel Lift	1		.49		6		
Inner Panel Landing	- 0	141	.106	.0026	2 2	15.9	9.55
Outer Panel Lift	- 6	154	.334	,0026	2	\$7.3	10.4
Outer Panel Landing	X	154	.2	,0026	2	10.4	3.9
(Struts)							
Inper	2.64	96	1.76	.0004	2	14.1	31.0
Outer		96	1.32	.0004	2	10.5	17.5
(K-Bara)							
tnoer Upper	26	56	.34	.0004	2	2.7	1.7
Inner Lower	134	56	.583	.0004	2	4.7	5.2
Outer Upper	3.4	56 56 56	.243	.0004	2	1.9	1.7
Outer Lower	11/6	56	.535	.0004	2	4.3	6.4
						97.2	106.45

sistance and Weight of Double Lift Truss System

	lize	Lgth.	Area (eq. ft,)	Kx.	No.	Ru. 2	Wt. ;
(Wires)							
Rear Inner l'anel Lift	10	131	455	,0026	2	23.6	17.7
Rear Inner Panel Landing	å	131	.284	.0026	2	14.8	8.85
Rear Outer Panel Lift	- 8	147	.318	.0026	2	16.5	9.9
Rear Outer Panel Landing	- 8	147	.191	.0026	2	9.9	3.72
Front Inner Panel Laft	- 22	131	.398	.0026	2	20.7	23.7
Front Inner Panel Landing	- 62	131	.228	.0026	2	11.8	6.5
Front Outer Panel Laft	34	147	.256	.0026	2	13.3	7.3
Front Outer Panel Landing	5%	147	.128	.0026	2	6.6	2.4
Inner Panel Inner	16	95	-166	.B026	4	17.3	9.1
Outer l'anel Inner	- 2	95	.124	.0026	4	12.9	1.8
(Struta)	•••						
Rear toner	2.42	84	1.41	.0004	2	11.3	22 8
Rear Outer		84	1.01	.0004	2	8.1	11.8
Front Inner	2 29	84	1.33	.0104	2	10.6	20.5
Front Outer	1 64	8.4	.96	.0004	2	7.6	10.5
					-	185.0	146.57



Plate 10-Shock absorbing rudder

It does not seem to me possible at this writing to further reduce the element of useless resistance and interference in the cellule truss, so let us pass to the third portion of our division the chassis. This element represents from 10 to 12% of the total drift in the average aeroplane at 100 m.p.h. and from 15 to 20% of the structural resistance.

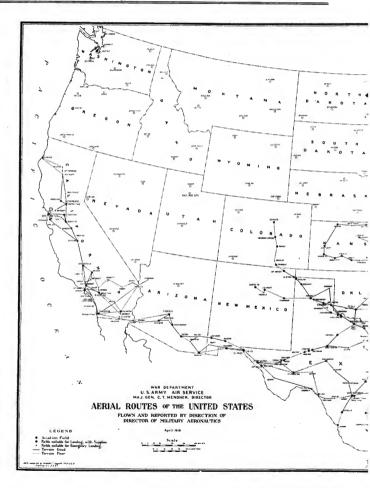
from 15 to 20% of the structural resistance.

The simplification of the parts of a chassis is no easy matter and there is little basis other than practice to guide the engineer. Fortunately, this is one of the features of an aeroplane which has had much attention and the process of elimination by trial has left us a type of chassis almost universally in use and of great simplicity. Roughly, it consists of an axle member spaced from the fissedgar by two V's in the longitudinal plane, while two sets of wires truss trans-



Plate 9-Chassis structure

versly for sheer. A still greater simplification is the replacement of these four wires by a sincle diagonal in the front shock abording means in the wheel so that the abock abording means in the wheel so that the ake fistell may form the transverse lower member of the front frame. Thus the crar members of the Vs are used only to steady with the control of the control resistance of this simple form the members of the front frame may be welded together and the upper forward ends journaled with Continued on page 489.





in the firedage. (See Fig. 1, Plate 9). Slots can then be provided in the external skin of the fuselege, so slaped as to house the classis frame members when the classis is suring backward and upward. (Fig. 2, Plate 9). Leaving the forward portion of the frame members and permits them to form a flush surface with the button skin of the fuselege when retracted. (See Fig. 3, Plate 9). Of course there are other ways of retracting a chassis, the

in order to meet both aerodynamical and practical demands the following will be recognized as indispensable features:

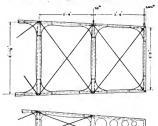


Plate 11-New type Plywood Truss

- 1. The chassis should be equally strong in spite of its retractable feature;
- 2. It should neither occupy useful space when retracted nor
- 2. It should neturer occupy useful space when retracted nor require an enlarged fuselage to house, it;

 3. It should not weight more, including retracting nechanism, than the ordinary chassis;

 4. It should be adapted in strength as an alighting device in any intermediate position between fully extended and fully retracted both in case the pilot should make a burried descent and in order to make available a handy means of varying the position of the chassis relative to the center of gravity of the aeroplane:
- 5. It should automatically close the housing recesses so that the fuselage or wing skin forms a flush surface when retracted:
- The gage of chassis should be independent of the width n
- of the tuselage;
 7. It should utilize the forces of flight, since they are always available, for power to retract and extend and such action should be entirely automatic when released by the pilot.

A chassis answering the above requirements has been in-stalled on a plane for the U.S. Army, but further details are not now available for publication. Thus we dispose of the third member of our subdivision and in a like manner we can dispose of the fourth, for it requires no great ingenuity to completely enclose all control leads and brackets and to internally truss the empermage members; as a proof of the latter see Plate 10, which shows an entirely successful method of disposing the tail skid within the rudder skin and in addition adds to the maneuverability of the machine when taxying on the ground.

We have now disposed of two of the four members of our useless division and reduced the remaining two to a minimum. For instance, it appears to the writer that in a machine like the U. S. Liberty Reconnaissance Fighter, where the empen-nage has been reduced to its two fundamental elements, the directional and longitudinal members must always remain, no matter how many years of aeroplane evolution transpire,

ractor supane has already been designed on the prin-ciple herein enunciated and the wind tunuel tests show a litt/drift ratio of nearly 11 with an aspect ratio of 6. An increase to more than 12 could be expected with an aspect ratio of 10. A Tractor Biplane has already been designed on the prin-

These considerations form the basis of the writer's opinion that the conventional type of tractor biplane has a better

• It is relatively unimportant whether it creates slightly more resistance when extended, since a modern aeroplane always has aurplus power to get away and structural resistance is an sid in reducing the landing speed.

chance of surviving from the aerodynamic standpoint than has the perfect or wing type aeroplane of small aspect ratio.

Useful or Aerofoil Resistance

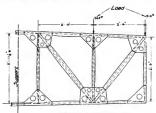
An aerofoil is a form or body projected through the atmosphere for an aerodynamic reaction. Thus a strut, wire, fuselage or chassis is not an aerofoil, but the main wing, Thus a strut, wire. the propeller blades, the ailerons, elevator damper and rudder are aerofoils because they function through the lift/drift ratio which might well be called the aeroplane first principle.

The lift or Ky of an acrofoil is the force, exclusive of nertia or gravity, which tends to deflect the acrofoil from the plane of propulsion,

The drift of an aerofoil is the resistance it offers to proulsion, exclusive of inertia or gravity.
We discover empirically that certain forms when propelled

We discover empirically that certain forms when propelled through the atmosphere have the properties of lift and drift and also that the ratio of lift to drift amounts to as much as 24 to 1 at 40 mph, with an increase of 10% for double increments of speed, etc. Although there have been many theories as to the cause or causes of the properties of aero-folls and these theories are responsible for the shape of some aerofolls, I believe it can truthiluly be, said that what we know about aerofoils to-day is simply the result of testing flat aerofoils and haphazard forms of all varieties.

This statement will no doubt offend several of my esteemed contemporaries who have well nourished theories of air enfluences on aerofoils, but the fact remains that given any of these pet theories as a guide for the construction of an aerofoil, and the aerofoil tested almost infallibly proves surprising in its lack of substantiation. On the other hand, the nearest thing to a principle for guidance in designing an aerofoil that the writer knows anything about is the injunction to copy an aerofoil known to possess specific qualities, and even this is a most precarious procedure unless the copying be exact, for the smallest changes produce results all out ing be exact, for the similest changes produce results all out of proportion to expectation and, my own experience in this field of aerodynamics would lead me to say that test of the particular model is the only reliable criterion as to its perculiarities. In short, the study of aerofoil theory and form has not yet reached the stage where any general conclusions can be drawn from which it would be safe to deduce the exact properties belonging to a specific form. Of the laboration exact properties belonging to a specific form. Of the labora-torial work now definitely planned and urgently needed fully 90% is not underway for want of facilities and it is a shame that our government does not appropriate for further wind tunnels and an adequate computing force.



Weight of Structure 17 Lbs. Plate 12-Plywood truss test

Of course the subject of aerofoils is a specialty in itself and cannot be discussed in a resume of the herein-undertaken

and cannot be discussed in a resume of the herein-indertraken sort. That branch of the study of aerfoliab which deals with propulsion is a work in itself calculated to energy and methicence of the best specials.

Factor Aeroplane Principle as follows: You will observe that in the ordinary aeroplane we oppose the large component or Ky of the aerofoli resultant to the gravity of the aeroplane, fuel and useful load we wish to carry and the small component of Kx of the aerofoli to the thrust we develop. But in an aeroplane having a load liftydriit of election, the time are replane having a load liftydriit of the develop. But in an aeroplane having a load liftydriit of 10 the thrust we expend is actually only one-tenth the air pressure in pounds we generate by virtue of the property of the sustaining aerofoil. Both these pressures exist simul-

taneously and the greater as a consequence of the lesser; but we compound the use of this advantageous principle by opne compound me use of this advantageous principle by op-posing the Ky or large element of the propeller blade to overcome the Kx or small element of the main aerofoil while we overcome the small or Kx element of the propeller blade by the gas pressure in pounds developed within the cylinders of our motor.

if the total lift/drift ratio of the propeller equals Now, if the total lift/drift ratio of the propeller equals ton or better then the actual pounds pressure in thrust of the propeller equals ten times the pounds pressure required to propel the propeller applied at the center of resistance of each blade, but if a smaller propeller were arranged at this point on each hade and the lift/drift of the smaller blade were ten or better, then only one-tenth the pounds pressure required to drive the large blade, would be needed to drive the small blade, but the small blade would develop the thrust required to drive the large blade!

Turning now to the control branch of aerofoils, we discover certain principles as fundamental as those in other fields and in practice we often find them ignored.

In general terms a control aerofoil is distinguished by its In general terms a control aeroloid is distinguished by its function of producing a moment about one of the three axes of an aeroplane. When the aeroplane is in flight at a given incidence and lift/drift ratio of the aerofoil. The member used to create the moment about the normal vertical axis is termed a rudder. The aerofoil employed to exert a moment are the moment are the control of the con about the transverse axis is termed an elevator (poor word) about the transverse axis is termed an elevator (poor word) and the aerofoil functioning to produce a movement about the longitudinal axis is termed an aileron. Among the important principles which should govern the form and disposition of controls are the following:

1. There should be no cross functioning such as attempting to utilize a control surface at one time for sustentation and at another time for control. This principle is fundamental and thoroughly defendable.

2. A control aerofoil should be disposed free of interference or if this is impossible, the interference should be calculable and uniform in effect. A wing end aileron is so disposed, a trailing edge aileron is not.

3. A control aerofoil should be sa disposed as to exert its 3. A control aerojou snoula oe sa auspasea as to exert us moment on an axis at right angles to that about which it functions, i.e., allerous should be on the transverse axis, ele-vator and rudder on longitudinal axis. A wing end aileron is so disposed, a trailing edge aileron is not,

4. Since the required moment may be created by less area and more leverage, a control aerafoil should be disposed as far from the axis about which it functions as is practical structurally. (A wing end alleron has a much greater leverage) age than a trailing edge ailcran.) 5. A control aerofoil should be of a double convex symmetri-

cal form in order to conform to the following: A control aerofoil should have a very slight Kx coef-

ficient at neutral position,

A control aerofoil should have no Ky at neutral position and equal Ky coefficients at equal and apposite anales of incidence

A control aerofoil should have practically no movement of its center of pressure for small angles, (See Fig. 1, Plate 1). A control aerofoil should have both its greatest cambre and its axis of support at its center of pressure.

A control acrofoil should be of deep cambre to entirely

enclose its support and operating mechanism.

Lateral control aerofoils should be neutralized so that they always create equal head resistance and are independent of the incidence of the main aerafoil.

the incidence of the unit aeraful.

The justification and application of the above principles is beyond the scope of this outline. I hope to prepare a treatise on aeroplane valability such a treatise will also deal with the disposition of the mass within an aeroplane which is very properly an aeroplane is subject but not too broad our subject by stating that practice indicates a tentral aeroplane plane to be the best and a neutral aeroplane is obtained by designing an aeroplane with concentric centers of gravity, lift, thrust, and drift (in short one having a Cutter) (see Plate 2), and eliminating all modifications of the wing for dishedrals, staggers, variations of cambre and incidence and varied plan form are taboo so far as stability is concerned.

Aerodynomic Aeroplane Control

What is meant by the "Principle of Aerodynamic Aeroplane Control?"

Briefly, I understand that aerodynamic acroplane control

comprehends use of the variations in the direction and velocity of the air flow local to an aeroplane extremity to produce an incidence of a control aerofoil.

There are six possible means as follows:

Decrease of the air velocity; Undraft or increased incidence:

Down draft or decreased incidence:

5. Right oblique airs;

6. Left oblique airs.

o. Lett oblique airs. In order for a neutral aeroplane to be deflected from a normal position, one or more of the above variations must be present, local to either the lateral or longitudinal extremity. When sensitive aero foils are disposed at the aeroplane extremity so connected to the ailerons or empeniage controls as to operate said controls to counteract the effect of the air variations on the aeroplane the plane may be said to be aero-dynamically controlled.

The accuracy and instantaneousness of such control will be apparent as contrasted with manual or automatic control which operates as a consequence of deflection from the normal instead of through the cause of deflection, thus antici-pating and curtailing such deflection.

The subject of aerodynamic control will be fully treated in the treatise on aeroplane stability,

The first principle of the structural aspect may be tersely phrased as "Greatest strength for least weight." Unless the structural features of the aeroplane are well cared for, the lift of the plane may be vitiated and the ad-

cared for, the lift of the plane may be vitated and the advantages gained by an excellent aerodynamic aspect lost. The dimensions and total stresses are determined by the aerodynamic aspect and the structural engineer's first job should be the preparation of a plan in perspective of the external surfaces and lines of the plane with the essential weights such as motor, tanks and useful load placed in positions of advantage for simplified trussing.



Sandloading the plywood truss

Of course the motor, pilot, gun, camera, mail or other weights to be carried should be so disposed relative to the transverse axis of the machine that the algebraic sum of their momens at that axis is zero.

Plate 3 shows a fuselage outline as an example of the above. The periphery of this body obtained by giving the minimum required enclosed cubic the best streamline form provides the dimentional limit for the structural engineer and his special task is to truss the allotted weight to the best nis special task is to triss the allotted weight to the best advantage, always maintaining a miform safety factor and selecting both materials and form of construction with a keen sense of discrimination to save weight and make accessible the various instruments enclosed. The most direct procedure is to sketch in the points of attachment for cellule, chassis and empennage and then construct a line stress diagram.

Having in this way determined the amount and location of the stresses, we next enter the intensely practical field of electing the material and form of construction to be employed,

(Continued on page 508)



TRADE REVIEW



Curtiss Co. Fights Plane Sales Here

The Curtiss Aeroplane and Motor Corporation started suit in the United States Court y eaterday to restrain the United Court y eaterday to restrain the United States could be used to the Corporation purchased from the British Government Canada to purchase in the United of these would be an infringement on thirteen patents owned by that concern, some of them controlling and basic and other covering certain structural features

of the planes.
In the bill filed yesterday the Curtiss
Company alleges the planes were manufactured in Canada and are exact copies
for the company alleges the plane was a copies
plane was selected by the British Government as training planes at outbreak of
the European war, and large numbers
were ordered sent to Canada for training
plitos there. The Curtiss Company algreat that in order to expedie production
a contract was entered into with the Britsis Government by which the later was
granted the right to manufacture the
were to be used only by the British Government for war purposes, and only in
Canada. It is alleged that these planes
are the ones United Aircraft Engineering
Copporation has been selling in the United
Copporation has been selling in the United

The court, after hearing arguments from attorneys for the Curtiss concern, issued an order requiring the United Aircraft Engineering Corporation to show cause why a restraining order should not be granted.

S. A. E. Summer Meeting

Plans are rapidly being completed for holding the Summer Meeting of the Society of Automotive Engineers, June 23 to 27, at Ottawa Beach, Michigan, which has been chosen because of the ideal facilities it affords for a meeting combining professional sessions with social features and recreation. One of the greatest advantages of the S. A. E. summer gathering is the opportunity for the engineers in the automotive field to become better acquainted and to exchange ideas and information.

and information, have the needing include papers on all important automotive subjects general interest to warrant their research of the subjects will be treated by Aeronautic subjects will be treated by engineers who have made a long and innauric work. A paper on engine cycles of the future is in contemplation, and it is possible that there will be papers on motorcycle design and on motor boat subjects. Representative exhibits of autophylogolamic papers of the papers of the proposition of the papers of papers of the pape

N. Y. Amenda Law to Permit Aero

Allamy, N. Y.—Three lills amending the state insurance laws to permit marine, fire and casualty insurance companies to insure against loss or damage to inaircraft have been signed by the Governor. The Governor also signed the Boodh bill requiring motor tracks operating on state highways to be equipped gying drivers a view of the road in the

Sell Castor Oil and Castor Beans Washington, D. C.—The Bureau of Aircraft Production sold castor oil and castor beans, forming a surplus above the needs of the Air Service, value at \$332,-027 80



Patrol of national foreast by Army aeroplanes to give early warring of fires developing in the foreast will begin June 1, according to arrangements completed with the War Department by the Forest Service. United States Department of tions covering a large part of the Angeles Mational Forest will be begun from a captive balloon stationed over the Army Balloon School over Arcadia, Cahif.

Two routes of aeroplanes patrol work will be operated from March Field, Riverside, Calif, and two planes will be used on each route, the routes will each be approximately 100 miles long, and each will be covered twice a day.

will de covered twick a day.

This will be the beginning of experimental work in which the adaptability of attrictal to forest partol work is sold a control to the control

The aeroplanes are not equipped with wireless telephone apparatus of such a nature that they can communicate with the ground without the installation of expensive ground instruments. Warnings of fires will be transmitted by means of parachuse messages dropped over a town, sometimes of the property of

Fires will be located and reported by squares drawn on duplicate maps, one to be in the possession of each aeroplane observer and another to be in the office of the forest supervisor. A fre-fighting truck, with ten enlisted men, will act as part of the fire suppression forces, and will be subject to the call of the Forest Service.

Johns-Manville Denver Office in New Ouarters

New York.—The Denver office of the H. W. Johns-Manville Co. moved from the Denver Gas & Electric Building to the Iron Building, 1021 Seventeenth Street. Louis H. Inglee remains as manager of this branch.

Ungar Becomes Vice-President of SKF Ball Bearings

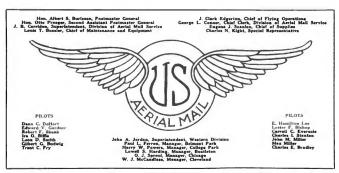
New York.—G. A. Ungar, who has been engineer and technical director of the SKF Ball Bearing Co. for several years, has resigned to become vice-president of the company, of which he has been a director since its organization.

Steel Spring Piston Ring Organized

New York—The Steel Spring Piston Ring Co, has been formed by A. J. H. Kuhsiek, formerly factory superintendent of Edward V. Hartford, Inc., and A. Meyer, formerly production manager of the same concern, to make the Bull Opring, a three-piece ring having several novel sales points.



Derothy Dalton and Pitnt Zimmerman in the Aeromarine flying boat in which they flew from New York to Atbany for the Victory Loan



The Aerial Mail Service-One Year Old

In his address before the Southeastern Aeronautical Congress at Macon, Ga., today, Second Assistant Postmaster General Otto Praeger reviewed the operation of the Air Mail Service as the pioneer employment of aeroplanes for commercial service.

"When we started the acrial mail with assistance of the army," he said, "we were told if we scored 50 per cent of the schedule trip, we ought to be satisfied, and that we might be compelled to suspend operation during at least three months in the winter."

When the first anniversary of the Air Mail Service was celebrated on the 15th of this month, the same two planes with the same motors that flew the aerial mail on May 15, a year ago, carried the mail on that day, after a year of continuous and stremous service through similaine, rain or gale. The Air Mail Service is a grant or gale. The Air Mail Service is an and as a postal facility. The record of the service, is more than 29 per cent of perfect, millions of letters being delivered to the people of New York on the

afternoon of mailing instead of on the following morning, as would have been the case if they had gone by rail. A total of more than 125,000 nules have

A total of more thai 125,000 mules have been flown in every kind of weather—one in a gale of 38 miles per hour and snow storms over New York om March 28, and one in a gale of 80 miles an hour of me in a gale of 80 miles an hour one hour of the storm of the storm of the meanty twelve months of regular service, we have had but thirty-six forced landines, all due to mechanical trouble. We have never had a plane carrying mail drop out of the sky beyond control. We have never killed a pilot of a mail plane, have never killed a pilot of a mail plane, juries, such as contuions or cut sustained in a plane turning turtle in a forced landing.

He said that to restrict aviation development and operation to a single bureau of the Government, whether civil or military, would be a blunder, and that at this formative state the Army, the Navy and the Post Office should each be provided with ample appropriations to develop commercial flying, and that the whole aviation industry should be given the amplest assistance that our Government can give.

Chicago-Cleveland Air Mail Service Shortene New York Mail Time Six Hours

Second Assistant Postmaster General Praeger, in announcing the inauguration of the Air Mail Service between Chicago and Cleveland May 15, states that this service will advance the carrier delivery of letters at Cleveland, Ohno, and Boston, Vork City, and Springheld, Mass., six hours,

At Cleveland the air mail from Chicago and western points will catch the New York Central train at 4 p.m. for the East. Under this arrangement the air mail will be delivered in Cleveland and Boston on afternoon deliveres instead of the following morning. At Albany, New York City and Springfield, Mass., this mail will catch the morning delivery instead of the afternoon following.

Letters mailed in New York City in time for N. Y. C. train No. 19, leaving at 5:31 p.m., will reach Chicago in time for 3 o'clock alternoon deliveries by carrier instead of the following morning carrier delivery, as would be the case if sent through by train.

UNITED STATES POST OFFICE AIR MAIL SERVICE

Monthly Report of Operation and Maintenance MARCH. 1919

-					70 %	-		_	-		1	-	7	SER	EVICE	AN	D UNI	T COST	_
Aeroplane No.	Gandine	Cerease and Oil	Office Force	Metorcycles, Trucks	Rout, Light, F. Power, Lekpho and Water	Macritanesse	Pilcu	Mechanics and Hupers	Repairs and Accessores	Internet on for eldowers	Departmental Overhead Charge	TOTAL	Callon of Casuline	Total Tame	4	Total Miles Run	Miles Run per Calibn of Casoline	Cont per Hear	Cont per Milk per
2 3 4 7 8 10 11 12 14 15 30 39 43 24224 36175 39164 397965	\$25, 97 89 69 15, 10 68 58 55, 18 6 10 109 08 57, 24 118, 75 124, 97 40, 18 92, 54 124, 97 40, 18 92, 54 124, 97 40, 18 93, 54 18, 15 33, 49	\$1, 92 23, 23 25, 25 16, 98 6, 89 24, 93 4, 28 27, 93 52, 42 11, 15 10, 30 17, 69 19, 80 5, 70 4, 33	\$29. 42 62.37 62.37 62.37 62.37 62.37 62.37 62.37 62.37 62.37 62.37 62.37 62.37 62.17 10.42 19.00 19.00	\$60 81 00 61 60 61 60 81 60 81 60 81 60 81 60 80 60 80	\$28 3.2 40 33 19 48 40, 33 40, 33 12, 01 41 33 29 32 49, 33 39, 73 19 48 49 33 7, 47 28, 32 20, 65 20, 65	\$111.38 122.92 55.77 122.92 121.92 121.92 121.92 122.92 122.92 122.92 122.92 122.92 123.92 107.35 96.38	342,69 153,53 11 78 108,77 117 21 242,36 133 511 291,94 375 10 36,71 97 19 60,96 9 75 20,62	\$48 13 280 29 31 72 500 86 294 86 297 24 96 39 263 31 393 13 243 78 243 78 243 78 243 78 245 74 46 37 45 37	\$40 45 23 60 49 00 17 50 39 15 49 10 129 90 21 58 40 10 186 45 24 12 86 40 12 10 272 X5 5 52 2 40	\$19, 46 519, 519, 519, 519 519, 519 519, 519 519, 519 519, 519 519, 519 519, 519 519, 519 519, 519 519, 519 519 519 519 519 519 519 519 519 519	\$59.45 59.45 59.46 59.46 59.46 59.46 59.47 59.47 59.47 59.47 59.47 59.47 59.47 59.47 59.47	\$5%, 04 974, 71 405, 52 917, 06 917, 64 123, 68 1, 266, 88 1, 266, 88 1, 266, 89 1, 216, 89 1, 243, 31 1, 243, 31 1, 269, 26 1, 269, 27 1, 269,	82 294 5h 223 181 30 359 122 392 517 414 68 60 111	30 11 24 31 32 33 7 6	20 47 t	248 872 90 794 666 222 980 387 180 218 652 633 90 128	3.02 2.97 1.80 3.13 3.35 4.14 5.92 4.1 1.64 1.50 1.15	\$139.80 75.00 405.52 99.60 92.40 56.28 56.38 53.40 42.80 250.80 319.80 109.20 111.40 405.00	\$2.0 1.11 4.5 (.3 1.5 4.5 2.2 3.5 5.5 5.5 5.5
fatal	\$1,167.06	8209.51	3798.70	\$1,094.49	\$527.62	\$1.762.57	\$1,800 00	\$3 (190,73	\$1,305.77	\$1 032.29	\$1,070.55	\$13.649,29	3 640	152	46 1	0.935	2.82	\$40.90	\$1.2

Civilian Flying Regulations

The War Department authorizes publication of the following statement from the Joint Army and Navy Board of Aeronautic Cognizance:

Before operating civilian aircraft, including aeroplanes, seaplanes and bal-loons, all persons must secure a license to do so from the Joint Army and Navy Board of Aeronantic Cognizance, Build-ing D. Sixth and B Streets, Washington, D. C., according to the Presidential Proclamation, February 28, 1918. During the parade of the 27th Division Presidential

in New York City, a tlying boat, piloted in New York City, a flying boat, piloted by an unlicensed civilian, flew up and down Fifth Avenue above the parade at a dangerously low altitude, estimated as between three and five hundred feet. In of engine failure, the pilot could not have reached a landing place, but would have been forced to land in the crowd on the avenue. The board cautions acroplane operators against a repetition of such an occurrence, and warns that licenses must be secured by civilian flyers.

The Army and Navy Board has control of all aircraft licenses for civilians, and points out that there is no way of ade-quately providing for public safety when aeroplanes fly at too low altitudes over cities or large assemblies of people. A heavy penalty is attached to violations of the regulations requiring licenses. Applications for licenses should be sent to Lieut. A. J. Clayton, Acting Secretary, Building D. Sixth and B Streets, N. W., Washington, D. C.

Artillery Adjustment by Radio Telephony

The experiment of adjustment of fire by radio telephony was recently con-ducted with gratifying success at the School of Fire at Fort Sill, Okla. Quali-fied observers though without previous radio telephone training, conducted shoots using radio telephony instead of the radio telegraphy with gun crews also untrained in this new method.

On April 22 one observer adjusted two

guns on a two-gun emplacement in 28 minutes from the time the plane left the ground until the end of the problem. his was the first time he had ever conducted a problem from the air with the radio telephone, having bothway com-nunication direct with the battery, and the gun crews were also new. It is believed that with trained personnel a pre-cision adjustment can be accomplished in twenty minutes, or a zone adjustment in three or four minutes.

The rapidity with which sighting can be accomplished by radio telephone is due to the high speed of transmission. radio telegraph is limited to sixty characters a minute.

New R. M. A.'s

The following-named officers, having completed the required tests, are rated as Reserve Military Aviators, to be effective from the dates set after their respective names:

Captain Louis R. Crawford, A. S. A., March 29, 1919.

Captain William G, Renwick, A. S. A., March 29, 1919 First Lieutenant Ward R. Clark, Infantry, March 29, 1919.

First Lieutenaut James C. Nabours, A. S. A., March 29, 1919. First Lieutenant Clarence J. Moors, A. S.

A., March 29, 1919. Captain Paul R. Turpin, A. S. A., March

29, 1919. First Lientenant George E. King, A. S. A., March 6, 1919. Second Lieutenant Howard C. McGregor, A. S. A., March 6, 1919. Second Lientenant Roy W. Chilson, A. S.

A., March 6, 1919. Second Lieutenant Henry C. Gamble, A. S. A., March 6, 1919.

Second Lieutenant John F, Dresing, Jr., A. S. A., March 10, 1919. Second Lieutenant James A. B. Roddie, A. S. A., March 10, 1919.

Second Lieutenant John Wilson Albright, A. S. A., March 25, 1919. Second Lieutenant Ralph J. Leeds, A. S.

A., March 29, 1919. Second Lieutenant Lester N. Stockard,

A. S. A., March 29, 1919, Second Lieutenant Woods Woodward C. Riley, A. S. A., March 29, 1919. Second Lieutenant William D. Jones, A. S. A., March 29, 1919

Ten Fields To Be Abandoned

The War Department has decided to al-andon the following flying fields Barron Field, Ft. Worth, Texas, Call Field, Wichita Falls, Texas, Carruthers Field, Ft, Worth, Texas, Eberts Field, Lonoke, Arkansas, Love Field, Dallas, Texas, Payne Field, West Point, Miss. Richfield, Waco, Texas. Taliaferro Field, Ft. Worth, Texas. Taylor Field, Montgomery, Ala.,

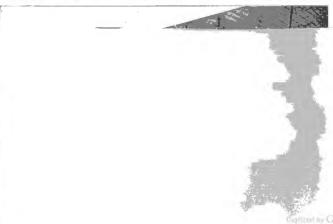
Gerstner Field, Lake Charles, La., as soon as equipment now in storage at these fields can be disposed of.

The aboudonment of Gerstner Field will be completed by June 30, 1919. It is intended to sell or salvage the buildings and improvements unless they can be utilized to advantage by some other department of the Government.

The War Department has requested information from these other departments as to whether they desire to make use of any of these fields, and, if so, that further details will be supplied by the Construc-Demobilization Committee of the General Staff.

Souther Field Note

Major Tom C. Macaulay who holds the transcontinental records will probably be in command of the squadron using seven De Haviland fours 400 horsepower Lib-erty Motors in the flight from Dallas, Texas, to Boston, Mass.





FOREIGN NEWS



New British Airship

We British Arship Victor Law of London, bas amounted the approaching completion of the Edo, of London, bas amounted the approaching completion of the Edo, and the William Complete Law of the Edo, and the Edo,

Australia to Have Air Service

The Australian government has completed a plan for aerial defeose and proposes to establish aviation schools with squadroos of aeroplanes, Melbourne oo April 21. The personal will number 1,400 men. The iotial expenditure will be \$2,500,000 and the annual expenditure there-after \$2,500,000 and \$1.000 and \$1.000

A Flight from Brussels to Peace Session

Paul Hymans, Belgiao Foreign Minister, recently made a fight to the Peace Session, leaving Brussels at 1 P. M. and arriving in Paris at 2 P. M. in time to attend the plenary aession.

Aeroplane Carrying Twesty-Five Goes Up More Than Three Milea The giant Farmao Goliath, which has been flying between Paris and Brussels, ascended to a height of 5,100 metres (approximately 16,732 feet) while carrying twenty-five passengers. The ascent was inside in one hour and fifteen mioutes and the descent in twenty-five minutes.

British Plan for Air Mails

The British pers generally asserts that the commercial development of the country. According to the American Chamber of Commerce in Ordero, a mail service from Laro to finds it to be stangurated. The Lordon, a mail service from Laro to finds it to be stangurated. The Lordon, a mail service from Laro to finds it to be stangurated. The control of Lordon and British possessions and equipped with sound and Egit agents, but loon, arrial husys and wireless ricergraph and ricephone country. And the Lordon are controlled to the Lordon and Lo

London Flying Club

Landon Flying Club

To the tremendous attention now being given to aviation for various commercial and governmental purposes in England, it is interesting to the commercial and governmental purposes in England, it is interesting to the commercial and governmental purposes in England, it is interesting to the commercial and the commerc

affairs, but for lectures with moving pictures of aeroplane progress. Annual dues for the first five hundred members have been fixed at ten gulhas for men and seven gulocas for women, with no cotrante fee. Members will be able to hire machines at reduced rates.

Germans Planned Using All Mctal Aeroplane

Cerman Finance Using All Metal Aeropham
The German sever had a chance to use their latest are restation
of the German sever had calcance to use their latest are restation.
The metal plane was made of aluminous, body, wing strint and all
when the control of the

General A. Piano, Chief Staff of the Chilem Army, and Capt. C. Garfaa, are, touring to world for the Chilem Army, and Capt. C. Garfaa, are, touring to world for the Chilem Army, and Capt. C. Farphaye here at Hazelburat Field, Mincola, accompanied by Col. A. Ernig, Mintary Attache of Chile in the United States. General Pinto established the Chilem Fiying School in 1913.

The Aeroplane for Colonial Trade

In the adaptation of the acroplane for Colonial Trade in the adaptation of the acroplane to commercial requirements the acroplane colonial capacity is a second of the acroplane constructed principally any heye a detrumental effect on the acroplane constructed principally any heye a detrumental effect on the acroplane constructed principally of the acroplane of

The Up-to-date English Mevies

The Up-to-date English Merries
to the speedily developed ciness nodustry, no, of the most knosty
questions the fills producer and distributor has to face, is that of delay
and uncertainty in the delivery of finis from one area to another. The
producers of the fills, "Power of Rights," in which the Frince of Wales
plays a part, have already develod that the serial route is the gubinous
Fighter Aeroplane, plotted by Capt. West, R. A. F., placed at their
diaponal.



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. MSMahon



Model Aeroplane Contests

The contests to start June 1 will consist of the following events: Hand launched for dissance.

Three individual prizes will be given for this contest; that

is, a first, second, and third prize.

The Villard Cup, which has been won two times by the Illinois Model Aero Club, will be offered again to the club. Illinois Model Aero Citto, will be orered again to the citto making the best showing as a team. This cup was donated by Mr. Henry Villard, of the Aero Club of America, and was 10 be the property of the club winning it three times. The Illinois Club has two legs on it, and if they win it again it is their property.

R. O. G. contest for distance.

Three prizes will be given in this event.

Construction contest for scale models. Only one prize will be offered for this contest, and will be exceptionally good. Prizes have not been decided on as yet, but you can rest assured they will be best ever offcred for Model Aeroplane

Contests. Contests.

The rules for conducting these flights are simply that they must be witnessed by at least three prominent men, or if there is a branch of the Aero Club of America in your city, invite some of these men to witness the flights.

A contest is not official where there are less than five con-A contest is not noticed where there are reso into income the testants. It is not necessary for all the contestants of one club to live in same town. A model flyer living in one town can compete with a club having its address in another tun.

The construction contest will be deedled by sending in photos of the model to this office. (Only clear photos will be deedled by sending in the construction of the contest of the cont

A description of the model must accompany he accepted.) the photograph.

If these events are well attended, it is our idea to run more

Ordersts later in the year.

Description of the prizes will be given in next issue of AERIAL AGE.

The Dowd R. O. G. Model

The model shown in the accompanying drawing is interesting, insamuch as it is successful to the succes

in is not a tate monet, as it was built in 1916 by Raymond E. Dowd, but the design is so well worked out that it is in line with the present-day models. Features of the model are the large span of the main plane and the

non-lifting tail with the main plane in front. Its appearance is different from from the average pusher type, and it would be well for model build-ers to take into consideration a few of the interesting features when designing models for com-

ing contests.

The main plane has an aspect ratio of about 7, the span being 411/2 inches and the chord 6 inches giving a surface area of about 1.7 square feet. The wing profile is the Eiffel No. 32, covered both sides with thin paper and set at an angle of 6° with the frame or fusclage. The entering edge is made to conform to the shape of the wing section. The trailing the wing section. edge is very thin and inserted into the ends of the ribs. The ribs are cut to the Eiffel No. 32 section, but flattened in front to butt against the entering edge and and drilled to decrease weight. The plane is then attached to the frame members with dress snaps. streamline plane-hangars hold the plane securely.

The tail plane is of the non-lifting type, and has a surface area of about 1/4 square foot. It is built around the cross braces of the frame and has one rib in the center.

The propellers, two in number, are 12 inches in diameter and have a 20-inch pitch. They are readily detached from the hooks by removing a pin which passes through a hole drilled in a slightly flattened section of the shaft, which is 3/64-inch brass spring wire. They are driven by fourteen strands of 1/6-inch flat rubber, which gives a propeller speed of 800 R.P.M. and a slight increase in dynamical speed.

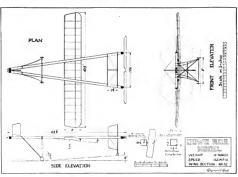
The keel surfaces, two in number, are set at the extreme front and rear of the model, the smaller one in front and the larger in the rear, built in with the non-lifting tail plane. The forward fin is adjustable for steering, and is held on mast set in the triangular block at the front of the fuselage. This fin, although not inclined in the original design, was found necessary to prevent the model from spiralling.

The landing gear, so fashioned to hold the model at an angle of 4° when resting on the ground, is made of ash members for the pieces under compression and of bamboo where they are in tension. These parts are then streamlined and fastened with thread and glue

The wheels are cut from pine and are 1½ inches in diameter. The rear wheel is 3½ inch, and is held in a fork of brass wire on the extension of the rear keel. It is cross-braced with fine wire and can withstand the severest shocks.

For the bearings, the rubber is held at the forward and on wire books passing through streamline blocks where they are formed into hooks for attachment to the winder. through this wire prevents it from turning in the blocks.

When starting on a flight the model rises from the ground after a short run, all the wheels getting off together. It climbs steadily without stalling as its fiying angle is only 4° less than its angle when resting on the ground. The flight is firm and steady, owing to the high degree of inherent stability contained in the Eiffel No. 32 wing section. As a result of the careful elimination of head resistance the model attains a flight speed of over 15 miles an hour. The total weight is 10 ounces, which means that the model carries over 14 pound to the square foot, considerably over the average for rubber-driven models of the filing stick type. The aver-age length of flight is slightly under 1,000 feet with a duration of one minute from 800 turns of the propellers.





Aeronitia is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a systhologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Ple

(From an Aviation Inspection Department) We answer countless calls a day

Upon our phones—cause for dejection; The tenor is in much this way; "Fix it, Inspection."

A tail skid's missing or a wing Is so we've really to correct it; Diurnal memorandums bring "Plane"—dash—"inspect it!"

It flatters us more ways than one To note in such and such connection The thoughtful things forever done For our inspection.

And we would but one kick inflict From out a rather large collection Upon our friends—why so restrict Us in Inspection?

We'd love examining the lines Of those of feminine inflection— When you're with Sue, May, Rose, betimes, Phone "6," Inspection,

Sgt. Roy Harris Russ.

For Real Estate Agents

An old joke in a new setting: Aviator: "I say, sir, that confounded land you let to me is badly drained. My aeroplane hangar has a foot of water in it." "Indeed."

"Yes, a pool of water, sir. What do you suggest?" Landlord: "I suggest you keep a scaplane."



New York's Aerial Police in Action
—From the N. Y. World.

Precocious

Fond Mother: "And do you know, dear, baby is always interested in aeroplanes. Every time he hears one he says 'Goo!"

Baby: "Goo goo!"

Mother: "The little darling. And look, dearest, the little man's quite right—there are two of them."

A Rigger Inspector's Lament

For years it seems I've tightened wires And added wind to rubber tires, Fixed the stagger, stabilizer, (Death's respects to an ex-kaisles, Worked like lury on turnbuckles; Longerons and scraped my knuckles; To Heavenly ere will live so. That c'en the angels fly wing low? That c'en the angels fly wing low?

Revised Editions of General Orders Issued

The reversed set of general orders for the armed forces of the United States following has been appearing in several of the aviation newspapers, and is said to have been first published by the Fort Omaha Gas Bag:

Itshed by the Fort Omaha Gas Bag:

I. To accept my discharge, take charge of all government property in view and beat it home.

To accept my discharge in a military manner, keeping always on the alert and observing that it will not be revoked before I get out of sight.
 To take the quickest train and not stop at any military

To take the quickest train and not stop at any military post on my way.
 To repeat all dope and rumor which has been spread.

 To repeat all dope and rumor which has been spread through buildings closer to headquarters than my own.
 To receive, believe and pass on to my children the ex-

perience I have acquired while in the service, or shall acquire in the future.

6. Not to again quit civilian life after being properly discharged from the service.

7. To talk to no one about re-enlisting.

8. In case of the presence of a recruiting officer to give the alarm.

When the girls are home to allow no soldiers or militia on or near my premises.

 In all cases not covered by instructions to claim exemp-

10. In an eases not covered by instructions to claim exemp-

 To salute all officers who have aided me in getting my discharge and all the Budweiser and whiskey now cased.

 To be especially watchful at night, and allow no one to pass without buying a drink.

-By Order of General Nuisance.

"Ex-Lieue-usun" writes to the editor of the Army and Nary Jonals." Having at last resumed my normal habitat and clothing, and feeling, therefore, extraordinarily irresponsible, to offer the following suggestion for service in foreign territory: For each period of six months' continuous active service in the state of Texas, one chevron of salmon pink, a cactus rampant and a mule couchant embroidered thereon, the same to be worn over the right lung, or as near thereto as the conformation of the bloose permits."



GOODATEAR ON EAR ON THE REAL OF THE PROPERTY O

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Disposition of Motors

Among the special problems which have arisen during the war is that of obtaining sufficient horse power to drive the large bomb carrying planes called Bombers. These aeroplanes weighing from seven to ten tons loaded required from 800 to 1200 horse power.

No power plant of more than 400 h.p. has been available so two or more power units have been required to drive the Bombers.

These motors have been mounted in the cellule on a special truss erected on either side of the fuselage and at sufficient distance from it to permit propeller clearance. This method of placing the motor has many serious and even dangerous features and requires engine bed supports trussed out into the open space ahead of the leading edge of upper and lower wings in order that the center of gravity of the motors may form a portion of the forward gravity moment arm of the Romber

There are several other arrangements, which involve considerable experiment and I have listed below the respective advantages of two of these plans,

ŧ.	Bevel Gear Transmission Drive	
	A. Two motors compactly loca within the finelage, where the do not create the dangerous ertia moment due to placing to tors in the cellule.	in-

B Complete failure of either motor leaves efficiency of Bomber un-impaired, since:

impaired, since!

1. Either motor will drive both tractor seres.

2. Either Sumbsan 300 h.p. motor will drive plane 74 m.jh. with 2 non nsetul load, [Refers to Market here].

2. Either Sumbsan 300 h.p. motor will drive plane 81 motor will drive plane 81 m.jh. (Refer to M.C.). 2. Either Sunbeam 300 h.p. motor will drive plane 74 m.p.h. with 2 ton useful load. (Refers to Martin Crussing Bomber.)

Martin Crussing Bomber.)

C. Motors are conveniently located for repairs as contrasted with their present inaccessible location in exposed portion of cellule.

Safety and dependability of Bomber are considerably increased due to

1. Independent transmission supports, for the best post, for the procession of the post, for the best processible post, for the processing the post of the processing the post of the processing the

a. Propeller breakage will not endanger cellule truss as it does in existing two motor machine.

2. Cellule stresses are less and more accurately calculable than they are when motors are lo-cated in the cellule.

cated in the cellule.

3. Bomber in spite of its large size can be manoeuvred with the name facility as single motored planes, for, a. Motor weights are similarly disposed within insclage.

E. Transmission system decreases structural resistance, in that, 1. Funcingle is no more resistance than that of the present two-motored planes and no motor housing is required in exposed portion of cellule.

F. Protection from fire, 1. The compact placement of the two motors makes the protec-tion of that portion of fuschage by steel artionr plate a com-paratively simple matter adapt-ting this type us a Trench Fighter.

G. Motors form important part of gravity moment arm, for 1, Motors are located forward of plane of tractor screw rota-tion, as a consequence.

a. Length of fuscinge forward of scilule can be shortened over present two-motored design, H The gear ratio permits the attain-ment of the most efficient propel-ler revolution ratio, also that of

Advantages of Direct reduction Drive as compared with Zeppelin Type transmission.

motors.

Weight reduction Dependability Reduction of Structural Resistance Less nicchanical loss of power

1. Direct Reduction Drive Both Motors located with-in a fusclage on common engine bed, which includes bearings for single propel-ler shaft reduction drive.

Same

Same

1. Motors are located forward of leading edge of aerofoil.

Disadvantage of Direct reduction drive as com-pared with Zeppelin type transmission. Loss of Revolving shell gun placement, Increase of fuselage skin

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My dear Son

My dear Son Jon sour Anne got your old dad going and morn to be a during stad you had something in you had some though the date of the source with the date of the source was to got you you had an artist up by Bulling Jon Son but the for the Source of the

big blunch of or also and a bagger absorber which we have an absorber by you are bunging felit and the big on Sunday at the your trung fellanced at you call it. The get here fell and it you call it was fellanced at you call it. The fell and the church is in Section get here as the bellestion was the arm as the bellestion was the arm as the bellestion was the arm as the arm to all the arms to be a second to b nighti, olim last. Drawn Growth Kie mom and I soud our best to

you all. Jour offeet Father on Smith of Smith you are the wright bond the trop ranner for

(Continued from page 493) The third gear box is of a special re-The third gear box is of a special re-duction type, in which two pinions are used, both engaging with one common spur wheel attached to the propeller. This is fitted to the after car, which is of larger dimensions than the others and carries two engines. All gear boxes are of sim-ilar detail design, the gear wheels being of large diameter, case hardened, and are fitted with pumps so arranged as to ensure a constant supply of lubrication to

the teeth and bearings, etc.

Small tanks are supplied containing the supply of oil for the gear boxes, and are fitted to the cars near the gear boxes. The radiators are coupled by aluminum

piping to the engines and to an aluminum tank arranged in the hull of the ship. Special arrangements are made to en-able the effective cooling of the radiator to be adjusted to suit the temperature of the surrounding air and the speed of the engines. Branch pipes are supplied for heating when on the ground and supply-

heating when on the ground and supply-ing cold water for stationary trials.

The fuel leads fitted by the builders of the ships were connected by the Sunbeam Company to filters and petrol cocks on the gondolas, the filters, etc., being duplicated so as to enable them to be cleaned

cated so as to enable them to be cleaned while the machinery is in motions fit-ings supplied with the entening, special oil at the control of the control o coolers can be adjusted to suit the run-ning and temperature conditions, and a fresh supply added to the oil in circula-tion from a tank situated in the main structure of the ship.

The oil circuit also incorporates a spe-cial filter so arranged that one half of the

chai diter so arranged that one half of the filter is continually in use while the other half is taken apart for cleaning purposes. In addition, the work of the Sunbeam Company includes the erection of all these Company includes the erection of all these parts, and the carrying of the whole of the machinery through the initial trials which included air-borne trials in the shed, and flight trials of eight hours duration. The whole of the machinery is entered arrangement of the gear being from data supplied by the Admiralty. The two bladed propellers are also manufactured by the Company, and those propellers, one of which is 19 feet 6 inches in diameter, were all rested by the Admiralty on a special rotury apparatus before being placed on the ships.

(Continued from page 485)

wind three miles an hour, flying 222 miles at the end of the first three hours. The next three hour period would find them with a wind directly on their tails, going at a speed of 70.5 miles, raised to 100 miles an hour by the wind. The sixth hour would thus find them 522 miles out. From that point on the winds would be favorable. Making from 99 to 95 miles an hour, the aeroplanes would swing slightly to the southeast for the first nine hours, and would then change to an al-most due east course to take advantage most que east course to take advantage of changing winds, swinging again to the southeast at the fifteenth hour of flight. Flying this course they would arrive at the Azores."

It would be possible, Mr. Curtiss pointed out, for the flyers to steer directly for the Azores, allowing for drift. This would not be as economical a pro-cedure as the one just described, but

might be preferred on account of its simplicity. If there were no winds at all, simplicity. If there were no winds at all, or contrary winds, the trip to the Azores would be one of thirty hours or more, as the speed of from 71 to 61 miles an hour would require that length of time for the flight.

Margin of Safety

As the Azores route follows for a con-siderable distance the course of trans-Atlantic steamers going from the United States to Europe or from Europe to the United States, these will join with the Government destroyers on duty in eliminating the control of the Covernment destroyers on duty in eliminating the control of the control of the course o nating any chances of disaster to the fly-ing crews. It is not probable, however, that ing crews. It is not probable, however, that these vessels will have an opportunity to practice life-saving. The N-C boats, if forced to descend, can ride a fairly high sea. Repairs made, they can ascend descending is remote. Of the four motors which each "ship" mounts, one will always be in reserve, and after the first fourteen hours, two will be in reserve. It is searcely probable that with pert care given them any difficulty necessitating descent will arise.

pert care given them any difficulty necessi-tating descent will arise. Gasoline, another important element, had in Mr. Curtiss's opinion been ade-quately provided for.

"For a twenty-hour flight such as that described above, about 8,000 lbs. of gas would be required. A thirty-hour flight, would be required. A thirty-hour ringin, with consumption lessening as the motor nower required is less, would need 11,000 lbs. This, I should estimate, will be the capacity of the N-C planes, and in case unfavorable winds prevail, a stop will case untavorable winds prevail, a stop will be made at Flores instead of at San Miguel, and a saving made of almost five hundred miles. In any case the sup-ply of gasoline will be ample."



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(Continued from page 480)

largest 'blimp' of the United States Navy has a hydrogen capacity of 180,000 cubic feet, the British have constructed airships of over 2,000,000 cubic feet of capacity.

The speaker also announced that it is known that Great Britain has designs completed and even now under construction, dirigibles of from five to ten million feet capacity, capable of skooting through the heavens at a greater speed than 100 miles an hour and that the great leviathans of the air are capable of round-trip, non-stop flights across the Atlantic, are capable of round-trip, non-stop flights across the Atlantic industry in Europe and this country, Mr. Upson predicted that trans-Atlantic dirigible traffic would be so common within the span of another year that the air-liner constructors would be working on ships for round-the-world flights.

Regulations for Airways Discussed

The convention on the evening of May 15 took up the problem in its application to the United States and Canada, proposing regulations which delegates believe will both safe-guard and popularies aerial trafte. As defined in the "discionary" of the regulations the term "airways" is used to designate all transcontinental or coastal air lines, while the connecting links are known as "air routes." The regulations declare:

"An airway is a belt eighty miles wide. All cities and communities located within this belt are designated as being on the airway. An aviator Bying on a clear day can see forty miles each side of his machine, and it is desirable to have the airway as wide as the aviator's range of vision."

The proposed regulations to govern air raffic provide:
That aircraft navigating between points less than 500 miles apart shall not go over the 5,000 feet altitude level; aircraft navigating between points from 500 miles to 1,000 miles apart shall travel at a height of between 5,000 and 1,000 feet; aircraft navigating between points 1,000 miles apart or over shall travel at a height of 5 to 1,000 miles apart or over shall travel at heights of not less than 1,000 feet; aircraft navigating between points 1,000 miles apart or over shall travel at heights of not less than 1,000 feet.

Dividing air travel into different levels, it was argued, will prevent accidents due to loss of altitude in flight. Some delegates, however, contended that such traffic regulations would be impossible of enforcement.

The regulations also provide that to guard against accidents due to dritting in fogs and darkness the airways are to be eighty miles wide. The aircraft will travel to the right side of the centre of the airway until they approach their destinations. Each airway becomes, therefore, divided into two 'one belt in the centre is a neutral safety zone. The ten mile belt in the centre is a neutral safety zone. The American airways are the Wilson airway, extending from New York to San Francisco; the Wright Brothers, extending from Washington, D. C. to San Diego, Cal.; the Langley airway, named sifer Professor Samuel Pierrepout

from New York to San Francisco; the Wright Brothers, extending from Washington, D. C, to San Diego, Cal.; the Langley, airway, named after Professor Samuel Pierrepont Langley, the pionner experimenter in aeronauties, extending from Philadelphia to Santa Barbara, Cal.; the Chanute and Bell airway, named after the experimenters in aviation, Octavo Chanute and Alexander Graham Bell, extending from way, named for Galbraith Perry Rodgers, first transcontinental flyer, extending from Newport News, Va., to Los Angeles, Cal.

Schot- running along the coast are: The Atlantic airway, extending from Bangor Me, to Key West, Fla; the Gulf airway, extending from Key West to the mouth of the Rio Grande, and the Pacific airway, extending from San Diego to Puget Sound.

There are two Canadian airways:—The "All Red" airway

Fuget Sound.

There are two Canadian airways:—The "All Red" airway will extend from St. John's, N. F., gateway of the transatlantic air route, to Vancouver, the gateway of the Pacific; the "Sunset" airway will extend from St. Johns to Prince Rupert, on the Pacific.

The various airways were shown on a large map which has just been completed and was displayed publicly for the first time.

Mrs. May Brown Dietrich, of New York, qualified on the afternoon of May I3 as the first woman golfer to fly to the actropian, she left the strand in front of the Hotel Traymore at two o'clock and eight minutes later was at the Sea View Country Club clubhouse, ready for a game of golf. A large white sheet has been spread out near the clubhouse by the management as the "range finder" for aviators. The success of the golf-taxic exploit has made a hit with the golfers, who are hooking engagements ahead for the eight mile run to the



Vol. 9, No. 11

MAY 26, 1919

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VOL. IX

NEW YORK, MAY 26, 1919

NO. 11

IMPORTANT INTERNATIONAL AERONAUTIC AUTHORITIES IN ATTENDANCE AT SECOND PAN-AMERICAN AERONAUTIC CONVENTION

Who Has Aeroplanes for Sale?

TOT less than a hundred people, including aviators, college men, representatives of different countries, sportsmen and sportswomen, are asking this question.

It seems preposterous that the aeroplane manufacturers are unable to make deliveries, but such is the case. Large firms with large output are sold out until the middle of the summer, with large output are sold out until the middle of the summer, and orders are piling up laster than machines can be produced. This is another evidence of the invaluable work done by the Second Pan-American Aeronautic Exposition held at Atlantic City during the month of May. The usual daily discussion of the possibilities of employing aircraft for different ourposes coupled with the enthusiasm and interest created by

the Aerial Races have resulted in hundreds of people wanting to use aeroplanes for pleasure, sport, and utilitarian purposes. As the Collegiate Races and other contests and events are As the Conegate Races and other contests and events are to be held weekly throughout the summer at the Atlantic City Air Port, and over a million people visit Atlantic City each month throughout the summer, the demand for aeroplanes will, undoubtedly, assume very large proportions. Let us hope that the manufacturers will be in a position to supply the demands.

Among the exceptional scientific papers presented to the Convention during the past week were remarkable papers by Colonel E. Lester Jones, Dir server, or "Fire Aeroplane in Surveying and Mapping," and by Lawrence B. Sperry on "Scientific Instruments for Aerial Navigation," These papers will be presented in forthcoming Navigation." These prissues of AERIAL AGE.

Luncheon in Honor of General Guglielmotti
A delegation of distinguished visitors, including representatives of seven different nations, guests at a luncheon sentatives of seven different nations, guests at a luncheon given in honor of Gen. Amelio Guigleimotti, Italian Military Attaché, by officials of the Second Pan-American Aeronautical Convention, rose to their feet and cheered for several minutes when President Alan R. Hawley, of the Aero Club of America, read a message aimounteing the safe Aero Club of America, read a message aimounteing the safe of the dinner given in the submarine grill at the Traymore, which is the standard of the dinner given in the submarine grill at the Traymore.

of the dinner given in the submarine grill at the Traymore.

"I wish to extend my congratulations to your great Navy,"
declared Gen. Guglielmotti, when he had been introduced.

"Two months ago at the annual dinner of the Aero Club
of America I expressed the wish that Americans would
be the first to fly across the Atlantic and now I am very



us of the many stitical affairs held at Atlantic City, in connection with the Second Pan-American Acrossius Convention and Expension.

**revert at this affair werst Brig-Conn. L. E. O. Chartino, C.B. C. M.G. D.S.O.; General Collinot, French High Commission; Col. T. E. Gilmers,

**add Deftish Attachés Capitaine Pierre Bear, French Mussion; Mr. Alin R. Hawley, President, Arc Club oil America; Mr. Augustus Post, Mr.

Henry Woodbouse and many other notables

glad to say my wish has been fully accomplished. The regular flying of ships overseas will enable the nations of the world to know and love one another better."

glad to say my with has been tally accomplished. The the world to know and love one another better.

The guests at the luncheon included:
The guests at the funcheon included:
Halling the following the following the function of the Italian Embassy. Halling the Halling

Commercial Aerial Photograph

Commercial Aerial Photographic Section of the Barcau of Aircraft Production, addressing the Second The Barcau of Aircraft Production, addressing the Second Pan-American Aeronautic Convention, declaring the aerial photography is certain to play a dominating part in future surveying and map making. He said in part: more production of the camera, together with the infinite dealit the photographs are produced by means grain the photographs reveal does work that is impossible for engineers equipped with transits, levels and plant tables to secure. The declared with transits, levels and plant tables to secure. The declared with the second to the second table to secure the production of the photographic survey, especially over strongest features. Many problems will come up that should be worked out in conjunction with the engineers.

"One of these is the possibility of making contour maps from stereoscopic negatives. Another the stabilization of the perpendicular to the terrain. This is a very important feature when it comes to piecing together pictures to com-

plete a certain territory because the least angle of the aero-plane will cause trouble when it comes to joining the pictures because of the list of the objects photographed. "Another is the possibility of supplying filters that will give

reasonably accurate information regarding shoals or obstruc-

tions beneath the surface of the water.
"In my opinion the work is of sufficient importance to warrant an extensive experimental program to determine the "We have found that the best results are obtained from an altitude of 3,500 feet."

The Art of Navigation

In an address on the "Recent Advances in the Art of Navi-

In an address on the "Recent Advances in the Art of Navi-gation" at the Steel Pier, Professor Charles Lane Poor of Columbia University, said in part: "The underlying principles of modern navigation were ex-plained without the use of mathematics. These principles were discovered by Captain Thos. It, Summer, of Boston, in were discovered by Captain Thos. It, Summer, of Boston, in ordinary navigator until toward the end of the century. At that time Admiral Marcq St. Hilaire, of the French Navy, developed, under the name of 'new navigation,' a modifi-cation of the Summer method, which is theoretically more claim of the Summer method, which is theoretically more the calculation involved was long and tedious, It was the bugbear of navigators. But even with this great handicap the method was so simple and its advantages so great, that it use, there arose a demand for some simple solution, some way of avoiding the tedious calculations. De Aujon tried to ac-

use, there arose a demand for some simple solution, some way of avoiding the tedious calculations. De Auino tried to accomplish this, and in 1912 published his 'Altitude and Azimuth Tables.' They are really a revision and extension of tables published in 1876 by Sir William Thomson (Lord Kelvin). They are double entry tables, require double interpolation, and are difficult to use if exactitude is essential. By using 'dead reckoning,' however, the calculations by means of these tables can be greatly reduced; but the way of determining this assumed position differs with seah 'sight' and the precepts to be taken into account in each reduction make the use of these tables a rather 'usey' affair.

"The real difficulty with the old tables which were used."

maticians to solve any and all problems, problems in trigonometry, in surveying, in astronomy, as well as working out sights at sea. These tables were, therefore, long and cumbersignts at sea. I these causes were never used at some, contained many, many things that were never used at sea. In 1914 a new set of mathematical tables were prepared, a set of tables arranged with one end in view, to solve this navicational problem in the shortest and quickest way; set of tables which does not contain an unessential figure. The principles and arrangement of these tables were adopted by the Hydrographic Office of the Navy Department, and such tables are now in use on nearly all naval vessels.

While these tables simplify the calculations and reduce the paper work to a minimum, yet they involve the use of logarithms and the chances of error in making additions,



Representatives of tweive countries, leading aeronautic authorities and other notables at one of the many official gatherings held at Atlantie the months of June, July,

"In 1917 the possibility of long flight by aeroplanes was already recognized, and the officials of the Aero Club of America took up the question of aerial navigation. I undertook to investigate the various methods of navigation, with view to eliminate, or simplify all calculations. Hilaire method was adopted as the basis on which to work and the various logarithm tables, de Aquine tables, Johnson tables, and other short-cut tables and methods of making the tables, and other short-cut tables and methods of making the necessary calculations, were carefully examined. All these were rejected as requiring too much time in working out a sight. In an aeroplane travelling at the rate of one hundred miles per hour, an observer would be carried nearly nine miles in the five minutes necessary for the practiced computer to make the calculations by any one of the three recognized methods. Besides this, the aviator has had little or no practice in mathematical calculations and it would take the average trained aviator, not five, but fifteen minutes to make the computations, and to this would be added the chance of making errors in all the additions and the nuisance of handling books, and turning from one page to another.

"The principle of the slide rule was thought of and it was

applied to the solution of the problem. Early in July, 1917, several forms of slide rules were made, each of which ac-complished the desired result. The earlier forms had several sliding scales; the form as finally adopted discarded all sliding parts. It consists of a fixed circular disc on which are en-graved a series of concentric logarithmically graduated circles, and two rotating members, which may be moved separately or

clamped together.

"The navigational slide rule, or, as it has been named by the Navy, The Line of Position Computer, apparently solves the difficulty. On it one actually performs, without knowing it, all the logarithmic calculations involved in working out a It, all the logarithmic calculations involved in working our a sight with an accuracy sufficient for all practical purposes at sea and in the air. The entire work can be done in less than a minute and a half, and with an average error of less than two miles. Experiments made in Washington show that after half an hour's practice, the average time required to work out a sight is one minute and six seconds. Reports from naval officers who have used these instruments con-stantly for months, and who have carefully checked their results against logarithmic calculations, show that the av-erage discrepancy between results as worked out on the Computer, and as obtained through logarithmic calculations, is about one mile; that the average time saved in working out each sight is about seven minutes.

Comparisons: Logarithm Aquino Computer

8 openings and 45 figures. 2 openings and 64 figures. I opening and 4 figures.

Aerial Transport and Airways

Epochal development of countries of vast territorial sweep Epochal development of countries of vast territorial sweep whose visions of commercial growth have been throttled by road lines, is to come on the wings of the aeroplane. Aeronautic authorities, speaking on the subject of "The Pan-American Aerial Transport and Airways Over Land and Sea" before the second Pan-American Aeronautic Congress,

expressed the conviction that aircraft offer immediate opportunity to such countries to actualize ambitions to take their territary.

Augustus Post, secretary of the Aero Club of America, who presided, introduced the subject by pointing out that inventions—particularly those that have increased the speed of transportation and intercommunication, like the steam-ship, the railroad, the telephone—have changed world conship, the railroad, the telephone—have changed world con-ditions. He asserted that the advent of the steamship made the Atlantic the central basin of the world, succeeding the Mediterranean Sea, and observed that it does not require un-due prescience to foresee that the Pacific will succeed the Atlantic as the central basin of the world, with the com-Artanic as the central oasin of the world, with the com-mercial development which aerial transportation promises to bring in South and Central America, the northwestern part of the United States, Alaska, Canada, Australia, New Zealand, Japan and China.

Boston-Atlantic City Flight

Three hours and 55 minutes flying time was the record established by established by established by established by in a flight from Boston to Atlantic City Air Fort—a distance of 340 miles by the air route. May 16th. Aviator Hodgeon carried Ralph. J. Dale, of Allston, Mass., as his passenger. The control of Boston, at 2.25 celeck, in a steady west wind. At 425 the plane was soaring over Long Island, where it made a landing at Central Park. The eviators had to go seven

a landing at Central rark. The aviators had to go seven miles by automobile to secure enough gas to replenish their supply for the run to the shore. They took supper at a nearby inn and took to the air at 6:10 for their trip to Atlantic City.

The machine appeared over the air port at 7:46, circled over the field and made a landing at 7:50 o'clock. They were given a dinner by the aero officials in recognition of their feat in making the long flight from an outside point the shore.

to the shore.

By their trip here they quality first for the prizes offered by the Boston Globe for the aviator who makes the best record in a flight to or from Boston during the month of May with the air port here as the landing or take-off become contenders for the Philteer trophy for the aviator who makes the best record in flying land or water planes from anywhere to Arlantic City or from the port here to anywhere during the month, and the New York Herald Efficiency prizes for the aviator making the longest non-stop run from any point to the shore or from Adhantic City to stome other point, the first prize being \$1,000.

New University Entries

Entries from four more prominent universities for the intercollegiate aeroplane contest has created keen interest in the new form of sport by the institutions in this section,

The race will be run around the pylons which are erected as turning points on the five kilometer course over the



ection with the Second Pan-American Aeronautic Convention, Exposition and Contests, which are to contin

RECORD OF THE COMPETITIONS

MAY 1st CONTEST:

ROLAND ROHLF, Ilon, Vietor Hugo Barranco, passen-eer, 90 hp. Currius 'Oriole' Biplane, from Westbury, Long and eight minutes. Return flight, one hour and twenty-five minutes. Both flights in driving storms. EDDIE STINSON. Lieut, 6. W. Shaw, U. S. N., passen-ger, 90 hp. Currius Biplane, from Queens, Long Island, to Adjunte City, Mr Port; two hours, thirty-three minutes, in

driving storm.
E. K. JACQUITH, 90 h.p. Flying Boat from Atlantic City to Rockaway Naval Air Station in driving storm; one hour, forty-five minutes.

MAY 2d CONTEST:

B. H. KENDRICK. 90 h.p. Flying Boat from Newark to Atlantic City; two hours, inteen minutes.

E. K. JACQUITH. 90 h.p. Flying Boat from New York to Atlantic City; two hours, twelve minutes.

MAY 3d CONTEST: A. LINVINGSTON ALLEN, with John P. Davis as passenger, flew from Roosevelt Field, L. I., to Atlantic City Air Port in one hour, twenty minutes.

MAY 5th CONTEST: EDWARD V. GARDINER left Bustleton, Pa., at 1:57 P.M. and flew to Atlantic City, arriving 3:07 P.M. Time, one and ten minutes.

ROBERT SHANK accomplished the same flight in the same time, but carried Pathe News operator as passenger.

ORTON HOOVER, in Curris MF. boat, flew from Allanic City to Walmat Street Bridge, Philadelphia, in two hours and twenty-five minutes, leaving at 5 P.M., and arriving 7.25 P.M., in driving electrical storm, carrying Charles Henry Davis as passenger.

Henry Davis as passenger.

ROBERT SILMS. MAY BA CONTEST: No. 755 Park Avenue.

N. Y. C., flew from Atlantic City to New Yest via Long Branch in two
and one-ball bounce, exact time of departure and array unknown.

ROBERT SILMS, with Mass Hard Aften as passenger, few from
moments, board of departure anknown, here, but time is correct.

The above flights were in competition for the Pulliter Trophy and
On May 10th, Mey M. L. Washing agree a demonstration of his particular of the particular control of the control of





THE NEWS OF THE WEEK



Professor Todd Sails for Montevideo to Observe Solar Eclipse from Seaplane New York, May 14.—Professor David New York, May 14.—Professor David Todd, who has charge of the Amherst College Astronomical Observatory, sailed May 13 on the American steamship Elinor, bound for Montevideo, to take observations of a solar eclipse on May 29. Professor Todd will make his observations from a naval aeroplane at an alti-tude of 10,000 to 15,000 feet, taking photographs of the phenomenon from the vantage in height thus gained, which is an innovation in astronomical observations

tions.
Prof. Todd is accompanied by Ensign G. L. Richard, Ensign W. H. Cushing, N. V. Copwell, J. P. Briggs, E. C. Leonard, and A. D. Hallington, all machinist mates, first class. A big naval hydroacroplane was on the after deck, from which it will ascend to make this

experiment.

Before sailing Professor Todd described the plans for his expedition as

"When the Elinor is in latitude 2.30 north and longitude 18 west at high noon on May 29, when the sun will be 15 degrees north of the zenith. The ship will be stopped and the biplane-hydro-aeroplane in charge of the navy crew will ascend to an altitude of from 10,000 will ascend to an allitude of from 10,000 to 15,000 feet above the sea, where it is hoped that we shall be able to get some fine pictures of the eclipse, which will last six minutes and fifty seconds.

"The object in going above the clouds to observe the eclipse is to get some clear pictures of the solar corona. Fully 50 per cent of the former expeditions to observe eclipses on land from the sea level have been failures because of clouds. I have been practising flying and making observations with my telescope from the

observations with my telescope from the naval station at Miami, Florida. "The rays from the corona which affect the human eye are the red ones, while the blue affect the photograph plates. These blue rays are absorbed by the atmosphere in their descent toward the earth from the corona, and the theory of ascending, say, 13,000 feet is that being one-third of the whole of the atmosphere the pictures will be much clearer.

Trap Shooter Flies to Tournament. E. Ballough, formerly of the 89th Aero Ballough, formerly of the 89th Aero at the grounds of the Arrow Head Rod and Gun Chub, to participate in a trap shooting contest held by the club, in a Curtiss JNAB biplane. The aviators are considered as message from Nayor John E. cess to the meet

McAlpine-Traymore Passenger Service Has Its First Trial New York, N. Y.—The first trip of the Traymore Air Service between New York and Atlantic City was made on May 14 with Miss Hazel Allen, hostess May 14 with Miss Hazel Allen, nostess of the McAlpin Hotel, as the passenger. The journey was made in a Canadian Curtiss 100 horsepower two-seater, with Aviator "Bob" Shanks as pilot, and the distance was covered in eighty-five min-utes. A favorable wind aided in making the trip.

The start was made from Belmont Field. The flight was made under the auspices of the Traymore Hotel of At-lantic City, and there was a large crowd in front of the hotel to watch the aeroplane land on the beach.

Packard Company Building Aviation Field Near Detroit Detroit, Mich.—Packard Motor Car Company has acquired a tract of land on the outskirts of Detroit for use as a private experimental flying field in the development of its aviation program. The development of its aviation program. field lies between Detroit and Mt. Clemens, almost midway between Morrow Field in Northwest Detroit and Selfridge Field in Northwest Detroit and Selfridge Field near Mt. Clemens; it is large enough to permit of the landing of any kind of aeroplane; it is accessible by improved highway and interurban railway; and it is easily susceptible of improvements which will be begun at once to make it a model experimental field.

Through the efforts of Messrs. Deeds and Kettering, a fine field has been established at Ohio State University, in and Rettering, a nite that has some tablished at Ohio State University, in Columbus. Prominent citizens of Detroit are supporting a movement to have the municipality take over the present U. S. air service field, known as Morrow Field.

officials of the Packard Company realize that the establishment of a series of fields within flying distance of their own will be of mutual advantage, and state that they will encourage the full utilization of every facility.

Liquidation Commission Balances British-American War Supplies Account With \$35,000,000 Payment to Us The Liquidation Commission in Paris.

of which Judge Parker is chairman, as-sisted by Mr. Chester W. Cuthell, Special Representative of the Secretary of War, Representative of the Secretary of War, dealing with Inter-Allied claims, went to London on April 30, and they have just cabled that after a series of conferences they have reached a complete and satisfactory adjustment of all outstanding claims which the British have against us and which we have against the Briti growing out of war supplies manufactured in this country or abroad, and that tured in this country or abroad, and that the net result is a payment of \$35,500,000 to us by the British. This covers the pro-duction of spruce, Liberty motors, wood distillates, nitrocellulose powder, cotton linters and wool.

Akron Balloonists Fly 400 Miles in 22 Hours

Washington, May 13.—Announcement has been made that the balloon entered by the ex-navy men of Akron won the Akron the ex-navy men of Akron won the Akron Flying Club Race by a 22-hour flight ending at Ocean City, Md. The balloon was piloted by Ensign P. D. Collins of the U. S. N. R. F. Second place was won by C. H. Roth and C. E. Earle, with C. W. Seiberling, vice-president of the Goodyear Co., as passenger. Landing was made at Millsboro, Delaware.

The balloons left Akron, Ohio, at 1 o'clock Sunday afternoon, all flying the American colors and each covered an approximate distance of 350 miles, ex-cept the one that made its forced de-scent in Pennsylvania, it having been fired at seventeen times by some unknown per-son or persons, and four of the shots took effect in the balloon, forcing a descent. The balloon shot down made its descent in Pennsylvania.



City of Akron, entry of John Gammeter, won the first Notional Free Balloon Roce, held since 1914, by a 400 mile flight to Ocean City, Md.



Frew of the Nevy dirigible C.S. Frem left to right: Com. E. W. Coli (commanding pilet). L. J. V. Lawrence, (pilet), Li. M. H. Easterly (radio operator), Ensign D. P. Campball 2nd assistant pilot), Chiel Mach, Mate T. L. Moormae tengineer) and Chiel Mach, Mate S. H. Blackburn (engineer)

Flying Field for Brighton Beach

New York, May 19.-Announcement was made that a group of former Army aviators of the British and American service will open a flying field at the old Brighton Beach Race Track, near Coney Island. Passenger carrying will be conducted at reasonable rates and a regular flying course given. A service between the Brighton Beach Field and New York City is contemplated, if permission for landing at Van Cortlandt Park or some other point can be secured from the municipal authorities.

Four aeroplanes will be in constant service and no admission to the field will be charged.

Aerial Motion Picture Photographers Form Company on Pacific Coast

San Francisco, Cal.-A company has en organized to take aerial films and photographs and carry passengers for advertising purposes throughout the State of California. B. M. Spencer, formerly chief instructor at McCook Field, is chief pilot. Several educational films have been taken from the air and the company is prepared to take photographs of cities and towns, real estate developments, rivers, lakes, irrigation projects, farms, ranches and estates.

Salt Lake City Aerial Sightseeing Service Salt Lake City .- On Decoration Day an aerial transportation and sightseeing



The Pioneer Wing of the Police Reserve Air Force inaugureted at Sheepshood Bay. The most, little Miss Dyer, is presenting a letter to her father, Police Inspector Dyer, in delivery Philodelphia

service will be inaugurated, according to service will be inaugurated, according to an announcement made by a group of Salt Lake City capitalists who are backing the project. Lieut. G. C. Beck, a former army aviator, is active head of the company and J. C. Kinney, an oil promoter, and L. J. Gilmore, president of the Utah Motor Company, are interested in the service

Army Aircraft to Fight Forest Fires

Washington, D. C.—Army aeroplanes and captive balloons will cover portions of the national forests of California, Arizona, New Mexico and other States this summer to aid in detecting and suppressing forest fires. In compliance with an order from Secretary Baker directing the Air Service to co-operate with the Forest Service of the United States Department of Agriculture in this work, con-ferences are under way to determine where and to what extent the air scouts will supplement the forest rangers.

That there is a distinct and important place for aircraft in fire protection of timberlands is regarded by the forestry officials as beyond doubt, but experimenta trial of methods and possibilities will have to be the first step. This is now being planned for the coming fire season. Army aerodromes and bases will be utilized for the experiments. Some of the bases near enough to national forests to be used advantageously are the flying fields at San Diego, Riverside and Ar-cadia in southern California. Other points in the West and in the East are under consideration, including one near the White Mountains in New Hampshire.

One of the interesting possibilities to be tested is bombing fires to put them out. It is believed that bombs charged with suitable chemicals can be used with good results. Another plan to be tested is transporting fire fighters by dirigibles from which ladders can be lowered to the ground.

The chief use of the aircraft this sum-mer, however, will be for fire detection. At present the foreign service relies for this partly on patrol, usually by men on horses, motorcycles or railroad speeders, and partly on watchers stationed at lookout points.

Lookouts in a very broken country, cut up by deep canyons or where mountain ridges obstruck the view, or in a flat country that affords no good points of van-tage, are often unable to pick up all fires quickly by the rising smoke, or to locate them accurately. For precise location the system in use depends on triangulation through reports telephoned from separate observation points. Aeroplanes will use wireless in recording fires, as they have done in communicating with the artillery, and would locate fires by co-ordinates in the same way that gun fire in war is directed to a particular spot or object.

Secretary Crowell to Study Civilian Aviation in Europe
Washington, May 17.—Benedict Crowell, Assistant Secretary of War, and a number of military and civilian aviation experts will leave for Europe on May 24 aboard the transport Mt. Vernon to study possibilities of developing the science of aviation along the lines of civilian usages.

Included in the party will be Lieut.-Col. James A. Blair, of the General Staff; S. S. Bradley, of the Manufacturers' Air-5. S. Bradiey, of the annuactures Air-craft Association; G. H. Houston, presi-dent of the Wright-Martin Aircraft Cor-poration; C. M. Keys, vice-president of the Curtiss Aeroplane & Motor Corporaof National Defense.

Colonel Halsey Dunwoody, Chief of the Air Service overseas, will join the party in France.

RECORD TRIP OF NAVAL DIRIGIBLE C-5

AFIER an historic flight, during which it was in the air over twent-over hours, the Navy diright C.5, which left Montauk Point, Long Island, and reached St. John's, Newfoundland, broke her moorings and was carried to sea. At the time of writing the dirighle has not been located, and it has officially been given up as lost. It is stated that plans are now being pushed by the Navy authorities to substitute another dirighble for the flight.

The CS arrived at the Pleasantville base, near St. John's, State basing in the air continuously for twenty-five, hours. FTER an historic flight, during which it was in the air

The C-S arrived at the Pleasantville base, near St. John's, after being in the air continuously for twenty-five hours and forty minutes. A perfect landing was made within the narrow confines of the old cricket field which was chosen as the anchorage for the airship. Lieutenant J. V. Lawrence was at the wheel at the completion of the voyage, and the manner in which he handled the ship while the landing was being performed evoked a cheer of admiration from the crowd which had gailhered.

As soon as she had been secured at her anchorage a big

force, under Lieutenant Little, was set to work preparing the ship for the transatlantic flight. It was not long before the sinp for the transatiantic light. It was not long before the treacherous wind began to play upon the dirigible, and early in the afternoon she was torn from her anchorage, but was recaptured and secured again. Immediately after arrival, Lieutenant Commander Coil and his crew got out of the car and prepared to take twelve hours sleep before continuing their flight across the Atlantic. Before turning in, however, he told the story of the trip to

Newfoundland.

In it he gave all the credit to Lieutenant Campbell and Lieutenant J. V. Lawrence, both of whom, he said, were weary "and almost seasick," but stuck to their posts. He

also described the period of several hours during which the

asso described the period of several nours during which the airship was "lost" over Newfoundland.

"We made a 'landfall' at 'St. Pierre," he said, "but found ourselves on the west instead of the east shore of Placentia Bay. From this point we attempted to follow the Chicago's radio directions, but they did not work. For the moment we were lost.

No Trouble From Fog

"We started 'cross lots' and saw about all of Newfound-land, and I must say that this is the doggondest island to find anything on I ever struck. Eventually we hit the rail-road track and followed it to Top Sails, which we identified, and then continued on to St. John's. There was considerable "Throughout the time we were trying to find ourselves we had difficulty with our wireless set, and part of the time

it was out of commission.
"Our troubles started just after midnight, when the sky become overcast. Before then we had been flying under a full moon at an altitude of 1,000 feet. We lost our bearings while approaching Little Miquelon Island, off the south coast of Newfoundland, about 170 miles from St. John's.

Commander Coil praised the work of the landing crew which moored the dirigible. Rear Admiral Spencer S. Wood, commander of the aviation base, greeted the C-5's com-

The flight of the C-5 established, it is believed, a world's record for non-rigid airships for total distance covered without a stop. The C-5 is 192 feet long, 43 feet wide, and 46 feet high; (Continued on page 552)

The Naval Dirigible C-5, which made a successful flight from Montauk Point to Newtoundland, was unfortunately torn from her moorings abortly after landler

THE TRANSATLANTIC FLIGHT

THE NC-4 arrived safely at Horta, the Azores, after covering the distance of 1,200 nautical miles between that point and Trespassey Bay, Newfoundland, in 15 hours and 18 minutes. She took off at 6.07 P. M., New York time, on May 16, and arrived at Horta at

9.25 A. M., New York time, on May 17. Her two sister ships, the NC-1 and NC-3, took off at Trespassey Bay at 6.09 P. M., and 6.07 P. M. respectively, but did not complete the trip to the Azores, owing to the serious weather difficulties in the heavy fog and landed at 8.19 A. M. 200 miles west of the island of Corvo, where her crew was picked up and the seapanle taken into tow by the steamship lona. Later dispatches reported that the NC-1 was abandomed after being towed a

Considerable anxiety was felt for the constant of the NC-3, the flagship of the fleet, when no news of her was received for a period of over fifty hours. Station of the flagship was a flagship with the flagship was a flagship was a

distance of 80 miles

That the NC-4, which is commanded by Leutenant-Commander A. C. Read, should be the only plane to complete the flight to the Anorea, after her difficulty in arriving at Tespassey Bay from Rockathar and the state of the transparent of the tran

%C-4	Left	Arrive	Knots		rs. Sp	eed
Rockaway to Chatham (May 8)	10.04 A.M.				nound	
Chatham to Halifax (May 14)	9.05 A.M.		340	4h	10m 45m	- 85
Halifax to Trepassey (May 15)	9.52 A.M.	5.37	461	8h	45m	58
Trepassey to Horta (May 16)	6.07 P. M.	9.25 A.M.	1,200	15h	18m	80
NC-I						
Rockaway to Halifax (May 8)	10.04 A.M.	7.08	540 461	9h	4m 56m	60
Halifax to Trepassey (May 40)	8.45 A.M.	3.41	461	6h	Show	-61
Trepassey to Horta (May 16)	6.09 P. M.					
NC-J	0.07 171111					
Rockaway to Halifax (May 8)	10.04 A.M.	6.58	540	8h	56m	60
Halifax to Trepassey (May 10)		7.31	540 461	6h	56m 52m	65
Trepassey to Horta (May 16)	6.06 P M			-		-
(Time is reckoned by New York time and distance sixty nautical miles being equivalent to sixty-nine lan-	and speed	are reckone	d by n	autic	al mi	iles,

The official log, as issued by the Navy Department, shows the progress of the planes during the entire flight. The log follows:

May 17, 1919, 8:45 a.m.—From naval radio station, Bar Harbor: "Progress of three scapliance from Trepassey to Astores: Ahead of estimated distance at 06:25 by 125 nautical miles. Above time 'planes reported passed Station Ship No. 13, 650 nautical miles out. Cape Race still in communication with No. 4."

8:58 a.m.—From Horta: "NC-4 passed Station No. 18 at 09-45 (5-45 New York time); NC-3 passed Station No. 13 at 06:23 (2:23 New York time); NC-1 passed Station No. 18 at 10:14 (6:14 New York time); NC-1 passed Station No. 16 at 09:17 (5:17 New York time);

9:32 a.m.—From Horta: "NC-4 passed Station No. 22 at 12:10 (8:10 New York

9:47 a.m.—From U. S. S. Melville: "NC-1 passed Station No. 16 at 09:17 (5:17 New York time); NC-4 passed Station No. 18 at 09:45 (5:45 New York time);

10:07 a.m.—From U. S. S. Melville: "Last report received NC-4 passed Station No. 16 at 108:80 (4:30 New York ime); NC-1 passed Station No. 13 at 07:13 (3:31 New York ime); NC-3 passed Station No. 9 at 04:10 (12:10 a.m. New York time);"

New York time)."

10:59 a.m.—From Horta at 13:25 (9:25 a.m., New York time): "NC-4 arrived Horta."

11:05 a.m.—From U. S. S. Melville: "NC-4 reported sighted land at 11:35 (7:35 New York time)." 11:06 a.m.—From U. S. S. Melville: "NC-I passed Station No. 19 at 10:14 (6:14 New York time); NC-3 between Station No. 17 and Station No. 18 at 09:15 (5:15 New York time), but off course; NC-4 passed Station No. 22 at 12:10 (8:10 New York time), weather

foggy"
11:08 a.m.—The Melville: "No. 4
passed Station No. 22 at 12:10."
11:10 a.m.—From Horta to naval radio
station at Arlington following message received from NC-4: "We have picked up
land again; think it is Pico."

11:11 a.m.—From Melville: "Last information received from NC-3 at 09:25 5:15 New York time), 'we are off our course somewhere between Station No. 17 and Station No. 18."

and Station No. 18."

11:12 a.m.—From Melville: "Last information received NC-4 passed Station No. 22 at 12:10 (8:10 New York time); NC-1 passed Station No. 18; NC-3 off course somewhere between Station No. 17 and Station No. 18."

11:46 a.m.—The Prairie: "Progress of

11:40 a.m.—The Frairic: "Progress of three sepalanes from Trepassey to Azores ahead of estimated distance at 00:25 (2:25 New York time), by 125 nautical miles. At above time planes reported passed Station No. 13. 650 nautical miles out. Cape Race still in communication with NC-4."

N. S. Lam.—From Melville: "NC-4 arrived at Horta this norning. Weather conditions Ponta Delgada: Weather around islands misty with frequent rain squalls."

2 p.m.—From the Prairie: "Extraoried and the state of the



The NC-4, which made a successful flight from Newfaundland to the Azores in 15 hours and 18 minutes

535

crews of seaplanes, plus cooperation all officers and men Trepassey ships. Aerography most important factor. Arrangements for weather reports complete and

3:30 p.m.-From U. S. S. Columbia at 3:30 p.m.—From U. S. S. Common at Horta: "NC-4 at Horta waiting for fa-vorable weather before proceeding to Ponta Delgada. Not expected to leave until tomorrow." until tomorrow

until tomorrow."

May 16, 1919, 6:03 p.m.—From U. S. S.
Aroostook: "Seaplane NC-3 began taxying for Azores flight 20:56 (4:36 p.m.,
New York time)."

6:23 p.m.—From U. S. S. Aroostock:

6223 p.m.—From U. S. S. Aroostock: Seaplane NC4 began taxying for Azores flight 20:53 (4:55 New York time). 7:10 p.m.—From U. S. S. Aroostock: Seaplane NC-1 began taxying for Azores leg, 20:53 (5:13 New York time). 7:17 p.m.—From U. S. S. Aroostock: Seaplane NC-4 took off water on Azores

Seapane NC-4 took on water on Azores flight, 21:36 (5:36 p.m., New York time)."
7:27 p.m.—From U. S. S. Aroostook: "Seaplane NC-4 landed Trepassey harbor 21:53 (5:53 p.m., New York time) after circling harbor."

7:52 p.m.-From U. S. S. Aroostook: Seaplane NC-4 took off water on Azores "Seaplane N.-4 took off water on Azores flight, 22:07 (6:07 p.m., New York time)." 7:53 p.m.—From U. S. S. Aroostook: "Seaplane N.-4 left water for Azores leg 22:06 (6:06 p.m., New York time)." Note—See 8:32 p.m. 7:55 p.m.—From U. S. S. Aroostook:

7:55 p.m.—From U. S. S. Aroostook: "Scaplane NC-1 took off water on Azores flight 22:09 (6:09 p.m. New York time.)" \$27 p.m.—From U. S. S. Aroostook: "Scaplanes NC-1, NC-3, NC-4 passed from flight at 22:20 (6:20 p.m., New York time.)"

8:30 p.m.—From U. S. S. Aroostook:
"Seaplanes NC-1, NC-3, NC-4 passed from flight on historic voyage at 22:20

(6:20 p.m., New York time).

(6:20 p.m., New York time)."
8:32 p.m.—From U. S. S. Aroostook:
"Scaplane N.C.3 left Trepassey 22:04
(6:04 p.m., New York time.)"
8-41 p.m.—From U. S. S. Aroostook:
"Scaplane N.C.1 left water at 21:36
(5:36 p.m., New York time), on Azores leg"; (delayed).

leg"; (delayed).

844 pm.—From U. S. S. Aroostook:
"Seaplane NC4 left Trepassey 21:36
(5.36) pm., New York time?); (delayed).

958 pm.—From U. S. S. Aroostook:
22:11 (6:11) pm., New York time?), on
Azores leg"; (delayed).

959 pm.—From U. S. S. Aroostook:
"Seaplanes NC4, NC3 and NC1 left
Trepassey at 22:11 (6:11) pm., New York
time!, for Azores'; (see 7:55, 7:52, 8:32,
New York Trepassey at 22:11 (6:11) pm., New York
time!, for Azores'; (see 7:55, 7:52, 8:32,
New York Trepassey at 22:11 (6:11) pm., New York
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New York Trepa

Navy Department).

11:12 p.m.-From U. S. S. Aroostook: "Last night new engine placed on NC-4. All 'planes given complete inspection this All planes given complete inspection this morning, warmed, and given finishing touches in early afternoon. Isovarble for start week, late afternoon, favorable for start (4:30 p.m., New York time); NC-1 got under way taxying at 20:50 (4:50 New York time); NC-4 got under way taxying at 21:31 (5:13 p.m., New York time); NC-4 stopped all motors at 21:18 (5:18 p.m., New York time); NC-4 stopped all motors at 21:30 p.m., New York time); NC-4 stopped all motors at 21:30 (5:31 p.m., New York time); NC-4 stopped all motors a again after delay of four minutes at 21:22 (5:22 p.m., New York time). All 'planes taxying around health. (5:22 p.m., New York time). All 'planes taxying around harbor to warm up mo-tors. NC-4 got off the water at 21:37 (5:33 p.m., New York time), and after circling around harbor and to the mouth of Mutton Bay she landed at Trepassey Harbor again at 21:53 (5:53 p.m., New York time), on account of seeing other 'planes not yet up. All 'planes made a long run down the larbor three points



rry G. Hawker, who took off from New-ndlend at 1:55 P. M., an May 18, has not a reported within 72 hours from his start

off the wind and took off, NC-3 leading off the wind and took off, N.-5 leaning at 22:05 (6:03 p.m., New York time), NC-4 following closely at 22:07 (6:07 p.m., New York time), NC-1 in the rear it 22:09 (6:09 p.m., New York time). They were flying low and circling around point across mouth of Mutton Bay. Three griant 'planes passed out of sight in the direction of Mistake Point at 22:20 (6:20 p.m., New York time). Weather condi-tions for Azores run good; with present wind continuing during night she should reach Azores in nineteen hours. The crews are in the pink of condition and are happy to leave on the 1.3/2-mile run." are happy to teave on the 1,3/2-mile run."

11:44 p.m.—From U. S. S. Prairie:

"All seaplanes passed Station 6 at 02:05

(10:05 p.m., New York time)."

11:50 p.m.—From U. S. S. Prairie:

"Planes passed Station Ship 3, NC-1 passed at 24:03 (8:03 New York time); last plane passed at 00:15 (8:15 p.m., New

May 19, 1919, 2:00 a.m.-From United

may 19, 1919, 2300 a.m.—From United States steamship Melville: "Seaplane NC-2 passed station ship 7 at 02:58 (10:58 p.m., New York time)," 2:09 a.m.—From United States steam-ship Melville: "Seaplane NC-4 passed station ship 8 at 03:29 (11:29 New York

ship Melville: "Scaplane NC-3 passed station ship 9 at 09:10 (12:10 a.m., New York time)." 2:11 a.m .- From United States steam

2:11 a.m.—From United States steam-ship Melville: "All three planes had passed station ship 8 at 03:50 (11:50 p.m., ew York time)

2:26 a.m.—"NC-1—have you heard anything NC-3? We have just passed station ship 13. Signed NC-1."

2:53 a.m.—"Thanks to the S. S. Nor-Same plane was

calling station ship 18).

3:56 a.m.—From Naval Radio Station,
Bar Harbor: "Last heard of seanlanes at 3:21 a.m. and signals were getting weaker. However, freak work may avail tiself early in the morning, and it is probable that we may hear seplanes until 6 a.m."

4:20 a.m.—From United States steamship Metville: "Seplane NC-4 passed station ship 14 at 07:06 (3:06 a.m., New

York time) ship Columbia: "Scaplane NC-1 passed station ship 13 at 07:13 (8:13 a.m., New York time)." 5:56 a.m.-From United States steam-

10th times.
7:04 a.m.—From United States steam-ship Prairie: "NC-4 passed station ship 11 at 05:50 (1:50 a.m., New York time)." On the day following, May 18, Harry G. Hawker and Lieutenant Commander Grieve started on their attempt to cross the Atlantic in a Sopwith biplane. Hawker will use the direct route from Newser will use the direct rolle from New-foundland to Ireland, a distance of 1,760 nantical miles. He took off at 1:55 P. M. Immediately after taking off, Hawker re-leased his landing chassis and headed east-ward at a speed of more than ninety miles an hour. No news of Hawker has been received within 72 hours of his start.



The Sapwith Biplane which Hawker attempted to fly across the Atlantic

THE STURTEVANT AEROPLANE ENGINES

PERFECTED developments of many years' experience in building aeroplane engines is represented in the Sturte-vant 8-cylinder engines. All features of design and construction are predicted on reliability and emphasis is laid upon this

point in test.

Balance of reciprocating parts has received individual attention because only by accurate balance both static and running can the engine operate without vi-

bration and stand out under the great strain which flying imposes. Exhaustive study has been given to the subject of heat treatment of high grade alloy steels with the result that import-ant improvements in methods have in-creased the strength of these materials at the same time reducing the weight of the

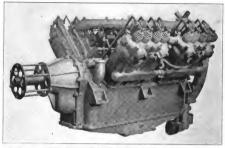
parts.

With the exception of some small acessories, all parts of the engine are made,
assembled, and tested in one plant, and
guaranteed by one concern. This applies guaranteed by one concern. This applies to forgings and all other processes in the manufacture of the engines. A large completely equipped test house is maintained with facilities for testing

under conditions closely approximating under conditions closely approximating actual service requirements. Each engine is subject to rigid preliminary tests for several hours at full speed, full load, after which it is taken apart, examined, and again given a strenuous final run for sevagain given a strennous final run for several hours under full load, full speed conditions. A complete record of the test performances of each individual engine is kept and a copy of the test record given to the purchaser.

General Specifications

The engine is of the eight-cylinder "V" type, four-stroke cycle, water-cooled. It is made in two models, as follows:



The Sturtevant Model 5A-41/2, 210 H. P. engine, showing magneto accessibility

Model SA-4½, 210 H. P., has a bore of 4½° and a stroke of 3½°, equivalent to 4½° and a stroke of 3½°, equivalent to ming crankshaft speed is 2.20° R. P. M. The propeller shaft, driven through reducting gera with a ratio of 53°, operates and the speed is 2.20° and a stroke of 5½°, equivalent to 102° mm. x 140° mm. The normal crankshaft speed is 2.00° R. P. M.; that of the

propeller 1,200 R. P. M.
The larger engine is designed for maxi-

mum power at high altitudes and is

equipped with devices for this purpose. It is essentially an engine for the high-

It is essentially an engine for the high-speed express type of aeroplane.

The smaller engine is articularly fitted for use in the training type of aeroplane and is designed with view to maximum

reliability and durability. The engines are similar in all major features of design and construction, Il-lustrations and descriptions of parts which

follow apply to both models. Table of Specifications

Madel SA

Bore		4"	(102	mm.)
Stroke		5.5*	(140)	mm.)
Displacer	nen1		555	cu in
Number	of cylinder	5		8
Arranger	nent of cyl	inders	Q(1º " " "
Cooling.				
Water	circulation	by centr	itugal	pump

Cycle+stroke 1gnition Two 8-cylinder high-tension magnetos

Carburetor, Zenith. Water jacketed manifolds

Oiling system.

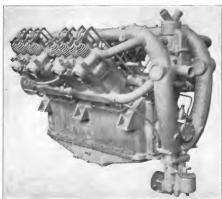
Dry sump, complete forced feed Weight with all accessories but without oil or water.......500 lbs. (227 kilos) Weight of water in engine.33 lbs. (15 kilos) Weight of water in Weight per B.H.P. dry,
2.95 lbs. (1.34 kilos)

Fuel consumption . . 55 lbs. per H.P. per hr,

Model 5A-41/2

Bore			4.	5" (114	mm.)
Stroke			5.3	" (140	mm.)
Displacer	nent			700	cu. in.
Number	of cyli	nders.			8
Arranger	nent o	f cylin	ders	9	0°-"V"
Cooling.					

Water circulation by centrifugal pump



Sturtevant Model 5A-4 1/2, 210 H. P. engine, showing water jacketed inlet manifold

Two 8-cylinder high-tension magnetos Magnetos...Two 8-cylinder high-tension Carburetors,

Zenith. Water-jacketed manifolds Oiling system,

Weight with all accessories but without oil or water.......480 lbs. (218 kilos) Weight of water in engine, 28 lbs. (12.7 kilos)

Cylinder

Cylinders are cast in pairs from an aluminum alloy and are provided with



Sturtevant with Christensen air starter

carefully fitted steel sleeves. A perfect contact is secured between cylinder and sleeve; nevertheless a sleeve can be replaced without injury to the cylinder proper. No difficulties due to expansion occur, on account of the rapid transmission of beat and the fact that the sleeve

is always at a higher temperature than the cylinder. A moulded copper asbestos gasket is placed between the cylinder and the head, permitting the cooling water to circulate freely and at the same time insuring a tight joint.

Cylinder Heads

Cylinder heads are cast in pairs from an aluminum alloy and contain ample water passages for circulation of cooling water over the entire head. Trouble due to hot valves is thereby eliminated, a most important consideration in the operation of an aeroplane engine. The water jacket of the cylinders, and large openings in both allow unobstructed circulations of the head only with the control of the control of the control of the heads and cylinders are clamped to the base by means of six long boths.

...

Valves located in the cylinder heads are mechanically operated. The valves and valve springs are especially accessible and of such size as to permit high volumetric efficiency. The valves are constructed of stems being made of one piece. The valve rocker arms located on the top of the cylinder are provided with adjusting ing screw to be securely locked in position, once the overest clearance has been determined. The proker arm bearings and reservoir. Cam rollers are interposed between the cams and the push rods in order to reduce side thrust on the push of the product of the process of the product of the push rods in the push of the product of

Valva Springs

Valve springs are of unique Sturtevant design, made of the finest alloy steel, and subjected to an elaborate heat treatment. The springs are of extremely large diameter and operate under low stress. Liability of valve-spring failure has been reduced to a negligible point.

Pistons

Pistons made of special aluminum alloy are deeply ribbed in the head for cooling and strength, and provided with two piston rings. These pistons are of exceed-



Rear view of the Sturtevant Model 5A-4½, 210 H.P. engine, showing thermostat, pump, and carburetor

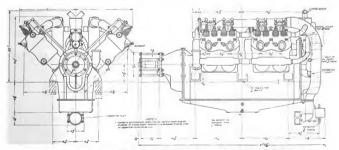
ingly light weight in order to minimize vibration and prevent wear on the bearings. The piston pin is of hardened chrome nickel steel, bored hollow. It is allowed to turn, both in piston and connecting rod. The piston rings are of species of the piston of the piston pince of the piston

Connecting Rods

Connecting rods are of "H" section machined all over from forgings of a special air-hardening chrome nixed steel. The steel, after being bett treated, has a tensteel, after being bett treated, has a tensteel, after being bett better than a teninch. Rods are consequently strong and yet unusually light and, being machined all over, are of absolutely uniform seccan be obtained. Big ends are lined with white metal and the small ends are bushed with phosphor bronze. Connecting rods with phosphor bronze. Connecting rods with phosphor bronze. Connecting rods by side on the craulepin, the cylinder latering offset to permit of this arrangement.

Crankshaft

The crankshaft is machined from the highest grade chrome nickel steel heat



Outline Dimensions Sturdevant Model 5A-41/4, 210 H.P. Engine and Model 5A, 140 H.P. Engine

treated in the Sturtevant furnaces in order to obtain the best properties of this material. The shaft is 2½" (57 mm.) in diameter, bored hollow throughout to insure minimum weight with maximum strength. It is carried in three large bronze-backed, white metal bearings. A new method of producing these bearings insures a perfect bond between the two metals and eliminates breakage. Base

The base is cast from an aluminum The base is cast from an aluminum alloy. Strength and rigidity are combined with light weight. The sides extend con-siderably below the center line of the crankshaft, providing an extremely deep section. At all highly stressed points, deep ribs are provided to distribute the load evenly and eliminate bending.

Sump The lower half of the base is of cast aluminum alloy of extreme lightness. collects the lubricating oil and acts as a small reservoir for same. An oil filter-ing screen of large area covers the entire surface of the sump. A small pad is pro-vided at one end on which is mounted the double-gear oil pump.

Propeller Shaft The propeller shaft is carried on two large annular ball bearings and driven from the crankshaft by hardened chrome nickel steel spur gears. These gears are contained within an oil-tight casing inte-gral with the base on the opposite end from the timing gears. A ball thrust bearing is provided on the propeller shaft to take the thrust of a propeller or tractor,

as the case may be. Camehoft

The camshaft is contained within the upper half of the base between the two groups of cylinders and supported in six aluminum bearings. It is bored hollow throughout. Cams are formed integral aluminum bearings. It is porcu integral throughout. Cams are formed integral with the shaft and ground to the proper shape and finish. An important develop-ment in the shape of cams has resulted in a maintained increase of power at high speeds. The gears operating the cam-shaft, magneto, oil and water pumps are contained within an oil-tight casing and operate in a bath of oil.

Lubrication

Lubrication is of the complete forced circulating system, the oil being supplied to every bearing under high pressure by a rotary pump of large capacity. This is



Cylinders, Cylinder Heads, Gasket and Cylinder Sleeves of the Sturtevant Engines

erated by gears from the crankshaft. The oil passages from the pump to the main bearings are cast integral with the base, the hollow crankshaft forming a and the hollow camshaft distributing oil and the hollow camshaft distributing oil to the camshaft bearings. The entire sur-face of the lower half of the base is cov-ered with a fine mesh screen through which the oil passes before it is recirculated. A scavenging pump draws oil from the sump as rapidly as it accumulates and delivers it to an outside reservoir which may be of any desired capacity.

Carburetor

A Zenith duplex type carburetor is used. It is of a double-barrel design with one to so a double-barred design with one float chamber and two jets, each supply-ing one group of four cylinders. It is located on the rear end of the engine be-neath the level of the base, permitting of gravity fuel feed, and connected to the cylinders by means of special, waterjacketed aluminum manifolds, the water jackets being cast integral. This type of manifold not only provides the cylinders creases materially the fuel economy. There is less carbon formed in the cylinder, and the exhaust is noticeably clean. The carburetion is entirely unaffected by outside temperature changes, the latter being of great importance at high altitudes.

An overhead type of carburetor instal-lation can be supplied. In this case two single-barrel carburetors are used, one for each bank of cylinders. They are located in an accessible position between the cylin-der blocks, are attached directly to waterjacketed intake manifolds, and have interconnected throttles.

Carbureter Altitude Comp-

The Sturtevant Automatic Altitude Compensating device for the carburetor is another important feature, which was developed and perfected through two years of constant experimentation. The func-tion of the compensator is to regulate the amount of fuel entering the cylinders in accordance with the density of the atmos-phere. The effect of this device, besides maintaining smooth running of the en-gine, is to decrease the fuel consumption gine, is to decrease the fuel consumption at high altitudes. Actual tests indicate a fuel saving of approximately 50 per cent. at extremely high altitudes. Uniform mixture and engine temperature insure maximum engine speed and maximum power at all altitudes.

Ignition is accomplished by two reliable cight-cylinder waterproof magnetos placed face to face between the two groups of cylinders in a most accessible position. Each cylinder is provided with double ignition by means of two spark plugs located in water-cooled bosses on the sides of the cylinder heads. This feather water the country of the country the engine operation, but in addition tends to improve operation and power at high speeds. The magnetos are synchronized by a vernier coupling, allowing most accurate adjustment.

The water circulation is accomplished by a centrifugal pump which delivers a large quantity of water through the cylinder jackers and maintains a uniform tem-

(Continued on page 556)



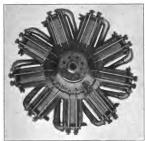
Sturtevant Test House, showing Sprague Electric Dynamometer

THE B. R. I AND B. R. II AERO ENGINES

THE B. R. 1 and B. R. 2 aero engines produced by Humber, Ltd., Coventry, were designed by Capt. W. O. Bentley, M.B.E. The Humber Co, were the first to take up the building for the B. R. 1 engine, which was developed improved upon. The result of these improvements was the B. R. 2 engine. This was originally manufactured by the Humber Co., but later, owing to the success of the engine, other companies were engaged in its manufacture. Companies were engaged in its manufacture. Corpet rotary engine was very much in favor, it occurred to Capt. Bentley that some improvement might be made in this, and the result was the designing by bim of the B. R. I. Capt. Bentley saw the vital importance of weight in this engine, and it is engine steel cylinders were used, the principle of the B. R.

engine steel cylinders were used, th principle of the B. R. engine is an aluminium cylinder shrunk on to a steel liner, with an aluminium piston, the result naturally being a very much lighter engine with consequent increased efficiency.

This engine, a nine-cylinder rotary type, was used princi-This engine, a mine-cylinder rotary type, was used principally for sociuting purposes, and became very much sought the most notable achievement of any machine fitted with the B. R. 2 engine was the bringing down of the famous 'ferman, Baron Richthofen, by the Canadian airman, Captain A. R. Brown, who was at the time using a Sopwith 'Camel' souting



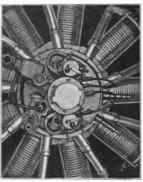
Front view of B.R.II engine, showing propeller huh and

plane. The following wire, received by Humber, Led., on that coasion from the Ari Ministry, is naturally prized as a curiosity:—"Boyd Calle wires from the Front: Inform Humbers famous star fighter, Baron on Richthoften, the Red Hun, crashed to-day in our lines by a B. R. 2 engine scout."

The detail measurements, etc., of the B. R. 1 and B. R. 2

engines are given below:

Rotary Engines.	B. R. 1	B. R. 2
Number of cylinders	9	9
Bore	120 mill,	140 mill,
Stroke	170 mill.	180 mill,
Cubic capacity	1922.65 c.c.	2770.83 c.c.
Normal b.h.p	150	250
Normal speed	1,250	1,250
Weight per b.h.p	2.67 lb.	1.9 lb.
Fuel consumption	11 g.p.h.	20 g.p.h.
Oil consumption	12 pints per hour	16.5 pints per hour



Rear portion B.R.I engine, showing magnetos, oil pump, alt

THE "UNION" AND "LIBERTY" MOTORS COMPARED

THE editors of Afrial Age have had prepared the following comparison of the "Union" and "Liberty" aero engines as a matter of historical record and interest to aeronautic engineers throughout the country. The comparison is of interest because of the efforts of two pioneer engine builders, located on opposite sides of the continent, working independently along similar lines and arriving at conclusions so nearly alike. From the data it will be seen that the two engines follow very closely the same lines. As the "Union" was designed to accommodate a larger cylinder than is at present used, the parts, consequently, have an exceptional factor of safety, which probably accounts, in a large measure, for its endurance qualities. In three conservative government tests it has set up three new endurance records.

new endurance records.

In going over this comparison it is interesting to note that the "Union" engine was designed in September, 1915, over two years before the "Liberty" came out.

GENERAL DESIGN Crank "Liberty" "Union" Seven bearing; hol- Same; with addition low pins and jour- of radial bearing

Same.

between propeller nals. and thrust bearing. Connecting Rods

I-beam section. Pistons

Aluminum Alloy. Same. Valve Mechanism

Camshaft above center-line of cylinder heads. "Packard" type of rocker arm used to prevent oil leak-age. Seven bear-

ings.

located Same. Provision to enter-line care for oil leak-r heads, age is of UNION design, rocker arm coming out of top of housing, then curving down to valve.—Same ob-ject in mind.

Water Manifolds Water inlet and out- Same.

let manifolds connected to cylinders and pump by means of short lengths of hose, to absorb vibration.

Value Springs Double. Right and Same.

left helical. l aive Cooling

is provided with special jacketing and water leaving cylinders is drawn from about the exhanst guide, thus cooling the stem and valve.

Exhaust valve stem Same.

Rocker Arm Contact Line contact (as Same, compared to point contact) between rocker end and rocker end and mating excessive wear due to old style set-screws, which gave only a point bearing.

Cylinders Steel barrel, with Same, except valve steel water-jackets. Hold down flange are in a semi-steel head welded to the located above cylinder bottom. main cylinder

forging. Journal Studs To relieve crank- Same. In addition, case of tension study connect studs connect through short yokes to the cylinresulting der flanges.

from cylinder explosions, studs holding main bearing caps terminate at upper end on top of crank-case. Ignition Two plugs per cyl- Same. inder. Current

stresses

transmitted through Kerite carried in grounded metal conduits.

Lubrication Force feed through Same, hollow crank to all

journals and pin bearings. Cam-shaft bearings and rockers similarly oiled through hol-low camshaft. Dry sump with external cooling reservoir.

Carburetion One "Zenith" Car- Same. buretor connected to each three cylinders through

water-heated mani fold. Dimensions Valve stem diam- Same.

eter Valve lift Same on exhaust. Inlet 1/16" less. Cylinder flange Same.

thickness Cylinder flange Same, plus four adstuds diameter ditional through studs to crank

Cylinder barrel Same to 1/82" less thickness below combustion Cylinder head thick- 1/16" greater.

14" less. Piston diameter. Piston length. 1" greater. Length to diameter 1.25 to 1. Length to diameter 123 to 1. ratio, 1 to 1
Piston pin diameter Same.
Piston pin wall 1/16" greater.

thickness. rod - Same

Connecting type of section Connecting rod - 1/16" greater. section, depth

Connecting rod — 1/16" less. section, width Connecting rod - Same. section, flange

Connecting rod - Same. bronze, babbittlined

Connecting rod - Same. thickness of babbitt Connecting rod -inside diam. lower 1/6" greater. bushing

Connecting rod — ½" greater. length of lower bushing

Ratio, connecting 4 to 1 rod length to crank throw, 3.49 to 1. Camshaft diameter 36" less (for 434"

cylinder) Camshaft, number Same, plus radial at Camshaft, thrust

Crank pins, outside 1/8" greater diameter Crank pins, inside 1/4" greater

diameter rank journals, 1/8" less outside diameter Trank journal-Crank pins, length Crank journal

Crank journals, in- 1/8" greater side diameter Crank length journals, 1/2" greater

Crank webs, width 1/2" g Crank webs, thick- Same 3/2" greater

Crank webs, radius Same

CLASSIFICATION OF LANDING FIELDS

THE War Department has issued the following memorandum concerning the classification of aeroplane land-

ing fields: Landing fields will be classified according to size, shape and accommodations into four classes; namely, first, second,

First Class Landing Field.

1. Shall conform with the general specifications as to size and shape or otherwise accepted by the Government.

 Character of the ground must be such that will allow safe landing and take off in all kinds of weather. In case of poor drainage must have a landing cross (see specifications). If L shaped field it must have two wet weather runways corresponding to the bars of the cross for each arm of the L.

3. All approaches clear allowing for safe landing and take off

4. Marking shall be a circle 100 feet in diameter with band 3 feet wide. Name of station and number in letters and fig-ures 15 feet long by 3 feet wide. Num-ber placed in Northwest corner of field.

'5. The accommodations shall be: (a) Hangar space, wind indicator, tools and other repair equipment.

(b) Supplies, gasoline, oil, water, sundry spares.
(c) Telephone communication.

(d) Transportation facilities.

(e) Attendants.

(f) Proper guard and enforcement of field regulations.

Second Class Landing Field.

1. Shall conform with general specifica-

tions as to size and shape or otherwise accepted by the Government,

2. Character of the ground must be such that will allow safe landing and take off in all kinds of weather. In case of poor drainage must have a landing cross (see specifications). If L shaped field it must have two wet weather runways cor-responding to the bars of the cross for

each arm of the L. 3. All approaches clear allowing for

safe landing and take off. 4. Marking shall be a cross arrow with bars 3 feet wide and length shall be deter-mined by the size of the field. Each bar-shall be 90 feet long provided field alshall be 90 feet long provided near ar-lows 600 yards runway. Proportionate length or 1 to 20 if under or above that, in case of L shaped field bars shall cross each other proportionate to each arm of the L. Cross shall be placed in position, each arm indicating center of runway. Arrowheads shall point North and West. Number of station in figures 15 feet long by 3 feet wide. Number placed in North-west corner of field.

5. he accommodations shall be:

(a) Hangar space, wind indicator with available tools and other repair equipment (b) Supplies, gasoline, oil, water and sundry spares.

(c) Telephone communication. (d) Near transportation facilities

(e) Attendants and guard available upon request.

(f) Enforcement of field regulations. Third Class Landing Field.

1. Shall conform in general specifications as to size, shape or otherwise accepted by the Government,

The character of ground must be such that will allow safe landing and take off in all kinds of weather.

3. All approaches clear allowing for safe landing and take off.

4. Marking shall be a cross with bars 3 feet wide and length shall be determined by size of field. Each bar shall be 90 feet long provided field allows 600 yards run-way. Proportionate length or 1 to 20 if under or above that. In ease of L shaped field bars shall cross each other propor-tionate to each arm of the L. Cross shall be placed in position, each arm indicating center of runway. Number of station in figures 15 feet long by 3 feet wide. Number placed in Northwest corner of field.

5. Accommodations shall be:

(a) Supplies available upon request. (b) Near city or town with available

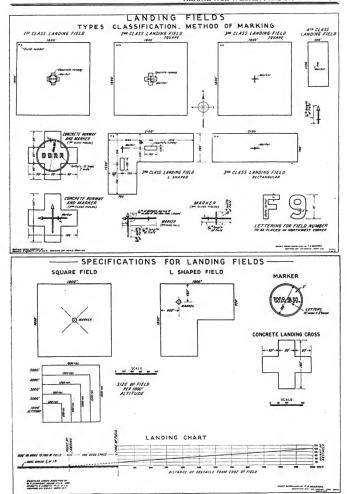
help upon request.
(c) Field regulations with available

guard. (d) Provision for informing pilots of available accommodations.

Fourth Class Landing Field.

1. Capable of landing only in emer- Capable of landing only in emer-gency. Marked with single arrow indicat-ing best approach and longest runway. Arrow 3 feet wide and length based on proportion 1 to 20 to 90 feet for 600 yards. runway, supplies available or not available upon request.

It will be noted that the Atlantic City Airport is larger and better in every way than is required by government specifica-tions for first class flying field.



CHARACTERISTICS OF LEADING AERO ENG

(Supplementary Tables of Characteristics Published

	RATED		NO.	BOF	RE&	5TF	OKE	MEP	VOL		LVES				M.A	BH	P.	COME	FIRING	ROTA	ATION		PER
ENGINE		TYPE	OF	M	M.	IN	5	LBS	IN3		LET	EXI		NORE	1AL	MAXIP	NUM	RATIO	1	-		RATI	
	H.P.		CYL	В	S	В	5	П.		Ms	LIFT	Nº	LIFT	RPM	BHP	RPM.	ВиР	innin	Union.	ENGINE	PROP		FUI
A.B.C	30	HOROPP	2	110		433				1	4.53		-	1800	-	2100	-	3.6-/	1-2	R.H.T			1.5
A.B.C	110	RADIAL	6			433				1	4.72	2	275	1700					123456			-	150
BENZ	230	VERTICAL		145		5.71				1	4.55		433	1400		1400			153624		RH7	-	19
B.R.1.	150	ROTARY	9			4.72				1	472		472	1250					135732462		RHT		10
BRZ	200	ROTARY	9	140	180	5.51	708	85		1	5.12	1	512	1250	200	1800	225	5.5-/	135792468	RHT	RAT	-	-
B H.P (GALLOWAY)	230	VERTICAL	6	145	/90	571	748	115		9	440	2	37/	1400	239	1500	253	49/	153624	RHT	RHT	-	14
BHP(SIDDELEY)	230	VERTICAL	6	145	190	571	748	110		1	440	2	37/	1400	243	1500	255	5.1	153624	RHT	RHT	-	13
BERLIFT (MERCENES)	110	VERTICAL	6	120	140	4.72	5.5/2	1/8		1	374	7	374	1400	109	1600	124	43-/	153624	RHT	RNT	-	
CURTISS OX-Z	90	"V"90°	8	101.6	127	4	5	1073		,	343	-	374	1300	B.C	1400	02	541	1234 7854	CITY	-		5.
-	90	V'90°	-	-			-	103	-	1	343	-		1350					1234 785				+
CURTISS VX	-	"V"90"	8	10/6					-	7	-	-	-	-	-								6
CUATISS V.X.	60	V 30	0	127	1/10	5	7	108		-	373	-	374	1400	204	/300	GIA	4/1	11224433	LITALA	CITAL	-	10
CLERGET	130	ROTARY	9	120	160	4.72	629	85		1	393	1	452	1250	133	/300	145	45.1	135792468	RHT	RHT	-	18
CLERGET (L 5)	130	ROTARY	9	120	172	472	6.77	85		1	393	1	452	1250	149	1300	153	48-1	135792460	RHT	RHT	-	8
CLERGET	200	ROTARY	//	120	190	472	7.55	-		1	-	1	-							PHT	RHY		-
FIAT ATZ	260	VERTICAL	6	160	180	6.29	706	114	-	2	437	2	437	1600	280	1700	285	43-1	153624	RHT	RHT	-	1/4
EIAT AIA	650	-	12			669				Z	-	2	-	1550					1		RHT		4.
GREEN	100	VERTICAL	6			551				1	315	-	8/5						142635				6
GNOME	80	ROTARY	7	124	iac	488	551	60.9		7	.157	-	354	1200	67	1250	ac	32/	1357246	PH	PHY	-	5
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RENAULT	190	"V"50"	8	125		-				/	393	1				1600		-	-	LHT	-	-	17
RENAULT	240	"V"50"	12	/25	150	492	5.90	1100		/	393	/	393	/400	271	1500	286	43-1	#35356224	RHT	RHT	-	12
ROLLS ROYCE	75	VERTICAL	6	101.6	1574	4	6	106		i	324	1	324	/600	93	1700	94	5.5.1	142635	LHT	LHT	-	5,
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GINES USED IN ALLIED NAVAL AIRCRAFT

bed in the March 3, 1919, issue of Aerial Age)

Table																				
NOTE 1	TR H	HPYION R ON STB	Co	CARRINGE	1730	MAGNE	τn	OII PIIM	p	WATER P	IMP	AIR PUM	IP			OIL	ТО	MACHINES	IN WHICH	SPARK
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10	UEL	OIL	ě	TYPE	No	TYPE	No	TYPE	Nº	TYPE	Nº	TYPE	Nº			US	ED	ARE USUAL	LY FITTED	USED.
17.5 5.34 W DUPLET DURSCH CENTRING	92	1	A	A.B.C	1	TBA MZ	1	GEAR	1	-	Г	-	Г	85		PHAR.	CASTON	RN.	A.S.	K.S.
17.5 5.34 W DUPLET DURSCH CENTRING	10	2	A	A.B.C	2	M-6-CYL	1	PLUNGER	1	-		-min		194		PHAR	CASTOR	MC-FLYING	OFF DECKS	H.S.
		634	W	BENZ	2	BOSCH-ZHG	2	GEAR	1	CENTRIFIE	1		-	8483		-	-	ALBATROS	SCOUT	
	05	145	A	BLOCK TUBE	1	ADS-ML	2	PLUNGER	1	-		PLUNGER	1	4/0		PHAR.	CASTON	SOPWITH	CAMEL	H-L-G-F9
			A	BLOCK TUBE	1	PLA-ML	2	PLUNGER	1			PLUNGER	1	485		PHAR.	CASTOR	SOPWITH I	EXPERIMENTAL	
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6 4 W ZZYLONT I BOSCIZOR 2 PLUMGER I CENTRINGA I PLUMGER I 4.55 CASTROLR AIRSOLPS 129 333 W ZDUPLEX I BOSCIZOR 2 PLUMGER I CENTRINGA I PLUMGER I 4.55 CASTROLR CUTTISS AND DE 20 50 333 W ZDUPLEX I BOSCIZOR I GERRA I CENTRINGA I — 3355 CASTROLR DIGHT PROMEN 100 4.2 W ZDUPLEX I BOSCIZOR I GERRA I CENTRINGA I — 5895 CASTROLR DIGHT PROMEN 100 4.2 W ZDUPLEX I BOSCIZOR I GERRA I CENTRINGA I — 5895 CASTROLR DIGHT PROMEN 101 4.2 W ZDUPLEX I BOSCIZOR I GERRA I CENTRINGA I — 5895 CASTROLR DIGHT PROMEN 102 4.2 W ZDUPLEX I BOSCIZOR I GERRA I CENTRINGA I — 5895 CASTROLR DIGHT PROMEN 103 14 A BOSCITROL I ADS 2 PLUMGER I — 5895 CASTROLR DIGHT PROMEN 104 A BOSCITROL I ADS 2 PLUMGER I — 5895 CASTROLR SOPWITH CAPIEL 105 14 A BOSCITROL I ADS 2 PLUMGER I — 5895 CASTROLR SOPWITH CAPIEL 106 W PRIDDITI I SIEMEN 2 GERA 2 CENTRINGA I PLUMGER I 910 CASTROLR SOPWITH FAIRMENT 107 16 W PART OFFILE I DIGHT I GERA 2 CENTRINGA I PLUMGER I 910 CASTROLR DIGHT PROMENT 108 16 W PART OFFILE I DIGHT I GERA 2 CENTRINGA I PLUMGER I 910 CASTROLR DIGHT AIR SHIPS 109 16.5 A BONGESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT AIR SHIPS 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT AIR SHIPS 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT AIR SHIPS 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT AIR SHIPS 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT AIR SHIPS 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 PLUMGER I — 5805 CASTROLR DIGHT CAPIEL 100 16.0 A HOMESTRI I ADS 1 P				-									-							H-L-6-F7
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00 4.2 W ZOLFICK E DEFENDE 2 GEAR. I CHRONOCK I — 695 CASTROLR CLUTTS S.R2 55 14 A BORTTON I A.D.5 2 PLUNGER I — PLUNGER I 410 PHORE STOR SOPWITH CAMEL 55 14 A BORTTON I A.D.5 2 PLUNGER I — PLUNGER I 410 PHORE STOR SOPWITH CAMEL 60 14 A BORTTON I A.D.5 2 PLUNGER I — PLUNGER I 410 PHORE STOR SOPWITH CAMEL 61 A BORTTON I A.D.5 2 PLUNGER I — PLUNGER I 910 CASTROLR DAY HAVE MERCHAN 62 40 W ZOLF S 2 DINIE I GEAR 2 CHRONOCK I PLUNGER I 910 CASTROLR DAY HAVE MERCHAN 63 416 W ZOLF S 2 DINIE I GEAR 2 CHRONOCK I PLUNGER I 910 CASTROLR DAY HAVE MERCHAN 64 W ZOLF S 2 DINIE I GEAR 2 CHRONOCK I PLUNGER I 910 CASTROLR DAY HAVE MERCHAN 65 11.5 A BOOKESTO I A.D.5 I PLUNGER I — PLUNGER I 950 PROFILE STOR A — 21.5 PROFILE STOR SOPWITH CAMEL 66 20 A MORESTO I A.D.5 I PLUNGER I — PLUNGER I 350 PROFILE STOR WITH CAMEL 67 A BOOKESTO I A.D.5 I PLUNGER I — PLUNGER I 350 PROFILE STOR WITH CAMEL 68 20 A M ZOLF S 2 DINIE I SEX 2 PLUNGER I — PLUNGER I 350 PROFILE STOR WITH CAMEL 69 2 A M MORESTO I A.D.5 I PLUNGER I — PLUNGER I 350 PROFILE STOR WITH CAMEL 60 3.5 W ZOLF S 2 DINIE I SEX 2 PLUNGER I — PLUNGER I 350 PROFILE STOR WITH CAMEL 60 3.5 W ZOLF S 3 DINIE I SEX 2 PLUNGER I — PLUNGER I 555 PROFILE STOR SOP DOLF STOR WITH CAMEL 60 3.5 W ZOLF S 3 DINIE I SEX 2 PLUNGER I MATERIAL PROFILE STOR SOP DOLF STOR SOP DOLF STOR SOP DOLF STOR WITH CAMEL 60 3.5 W ZOLF S 3 DINIE I SEX 2 PLUNGER I MATERIAL PLUNGER I 355 PROFILE STOR SO DOLF STOR STOR SO DOLF STOR STOR SO DOLF STOR STOR SO							1	THE RESERVE THE PERSON	-		+		-		Н					
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20 3.8 W ZOMPAN I V V SAMIL 2 NESSAMIL 1 (ZEROMAN) FLINTERN 1 5.15 PRACESSOR SO POLITRIN AND BOA (2007) 1 (ZEROMAN 1) FLINTERN 1 5.15 PRACESSOR SO POLITRIN AND BOA (2007) 1 (ZEROMAN 1) FLINTERN 1 5.15 PRACESSOR SO POLITRIN AND BOA (2007) 1 (ZEROMAN 1) FLINTERN 1 (ZEROMAN 1) 5.15 PRACESSOR SO POLITRIN AND BOA (2007) 1 (ZEROMAN 1) 5.15 PRACESSOR SO POLITRIN AND BOA (2007) 1 (ZEROMAN 1) 2 (ZEROMAN 1) ZEROMAN 1 (ZEROMAN 1) ZEROMAN 1 (ZEROMAN 1) 2 (ZEROMAN 1) ZEROMAN 2 (ZEROMAN 2) ZE	-		1	110.12.012	r	71.2.0	ľ	100000	Ė		1	2011027	ŕ	000		717111		00. 1111		
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5.0 T. W. ZURRYARI I. B.T.M. 2 (**SEASTAN I. ELEMENTAL I. PLUMEER I. 515 PRANCESSON "N. THAN F. BOAT. THAN F. BOAT. T. 575 S. Y. BURATTON I. B. STATE I. S. STATE	20	58	W	Z-00P-48-00	1	DINIE	2	BECERTRIC	1	CENTRIFUGAL	1	PLUNGER	1	515		PHAR.	CASTOR	SOP-DOLPHI	V ADF BOAT	H.L.G. F7
7.5 9.5 W 243.52 Z 2000-000 = CEAR 3 LINTINGE C20 MORLE O CONVENENT PACE LINE 1.00		7./	W	Z-DUP-484	1	B.T.H	2	ECCENTAK VALVE	1	CENTRIFUGAL	1	PLUNGER	1	515		PHAR	ASTOR	NT-TWIA	F BOAT	KLG F7
70 95 A MORTHMET I A.D.S. I. PLINGER I LIMITARY - NOWE - 260 PRANCASIN 55.05.00 PLIN ARTHORY 1. INTRINAY - NOWE - 260 PRANCASIN 55.05.00 PLIN ARTHORY 1. INTRINAY - NOWE - 260 PLIN AS D. S.O. PLIN ARTHORY 1. PLIN AS D. S.O. PLIN ARTHORY 1. PLIN AS D. S.O. PLIN ARTHORY 1. PLIN AS D. P. C. S.O. P. ALBATROSS SUPLAM 1. INTRINAY - PLIN GER I 440 I.3 WAS AS D. E.Z.C. S.D. E.Z.C. S.D		9.5	W	2.03.52	2	DETCO-DUNE	-	GEAR	3	CENTRIFUGAL	1	-	-	820		MOB	VE'B	DH4 HANDLEY	PAGE LEPERE	AC TITAN
	7.0	95	A	BLOCKTOBE	1	A.D.S	1	PLUNGER	1	CENTRUFUGAL	=	NONE		260		PHAR	CASTON	58 3D-50P	WITH AVRO	OLEO(3PT)
13	1.3	10.16	W		2	BOSCHALS	2	DOUBLE AT UNG	1	CINTRIFUGAL	1	-	-	900		-	-	ALBATROS	S BIPLANE	-
	7	503	A		1	AB	1	-		-	-	PLUNGER	1	440		1-3 VA	ASB	BEZC &	BE.ZE	LODGE (MODA)
5 6 5.0 A LABESSON I AS I MOTARY I — — — 520 IZYM AS D DIG -N FARMAN I S 8 0 W 2-42 DC I SEY Z ROTARY I — — — 550 IZYM AS D DIG -N FARMAN I S 8 0 W 2-42 DC I SEY Z ROTARY I GERN I — 665 IZYM AS D LAST CINCRI FARMAN I GERN I — 665 IZYM AS D LAST CINCRI FARMAN I GERN I — 665 IZYM AS D LAST CINCRI FARMAN I GERN I — 560 IZYM AS D LAST CINCRI FARMAN I GERN I — 750 IZYM AS D LAST CINCRI FARMAN I GERN I — 750 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER I PUMBER I A 10 IZYM AS D LAST CINCRI FARMAN I PUMBER	33	4.56	A				1	-		_	-	PLUNGER	1	495		1.3 VA	(AaB	D.H.	6	KLG F8
	14.5	65	W	34 MMA	2	A63	2	TRIPLE GEAR	1	CENTRIFOGAL	2	PLUNGER	1	780		13 VA	A&B	D.HA-CE.	SEAPLANE	KLG F7
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O O W O SEY Z DOTARY I GER I - SEO I Z VALA 8 GAS CHINCE FROMEN DIP. 20 IO W Z DEP 40 R Z Z REMINDE 4 GEAR Z CHINTING I PLUNCER Z 850 I Z VALA 8 GAS CHINCE FROMEN DIP. 20 A W CH. 25 M Z DIRE I GEAR Z CHINTING I PLUNCER I 410 CASTROL-R BEZ E MANDLE FROMEN DIP. 50 6 O W CASTROL-R DEZ E MANDLE FROMEN DIP. 6 6 O W A WATTON DIP. A Z I I J J J J J J J J		5.0			1	AB	-		1		-	-	-							KLG FB
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The AIRCRAFT TRADE REVIEW



Truck Repair Parts Delivered by Aeroplane

Wabash, Ind., May 10.-The first deliv-Wahasin, Jund, May 10.—1 he hrist deily-cries of repair parts for Service trucks were made on May 10 when two aero-planes, operated by the Service Motor Truck Company, made a flight to Akron, Ohio. Repair parts were ordered by wire this morning by the Firestone Tire and Rubbar Company for the Service trucks operated by them.

The wire was 12 minutes in transit, and 18 minutes after it was received at the 18 minutes after it was received at the Service Motor Truck Company the first plane was on its way, and the part ordered was delivered in Akron 2 hours and 45 minutes later. The distance covered was approximately 250 miles.

The Service Motor Truck Company is the first company in the United States to make use of a viation in a commercial way.

They operate four Canadian JN-4 planes, which are under the control of experienced army fliers, who, in addition to decircuit army filers, wao, in addition to de-livering Service truck parts, have organ-ized the Service Aviation, Training and Transport Company, which is training avi-ators, arranging for passenger flights, making express deliveries and staging ex-

New Cantilever Models Being Constructed

So many demands are being made for wo-seater "Bullets" that the Cantilever ero Company of New York, has entered upon the manufacture of two new models. One will be a two-seater monomodels. One will be a two-seater mono-plane, the other a two-seater biplane. Two of each of these models will be entered in the Pan-American Aeronauti-cal Competitions at Atlantic City. Owing to the flexible wing construction and the entire absence of struts and wires, these aeroplanes are considered favorites in every event. Many college flyers are to be in this meet and are inquiring for Cantilever aeroplane knowing their great

Dr. Christmas, president of the company and inventor of the flexible wing aeroplane said:

"The crucial test between the flexible wing aeroplane and the rigid wing aerowing aeroplane and the rigid wing aero-plane will come in the competitions at Atlantic City. Many of the rigid wing aeroplanes will use 300 or 400 horse-power engines with unusually large liftsower engines with unusually large lift-ing surfaces and every accessory that can be put on an aeroplane to increase speed and lift, but with a small 165 horse-speed and lift, but with a small 165 horse-posed and lift, but with a small 165 horse-ton of the lift of the lift of the Aeroplane to beak all records. Our Bullet has already made 197 miles an hour at ½ horsepower and its good fly-ing qualities are widely recognized. "The new aeroplanes which we planning will have retractable chassis— under the first retractable chassis patent with no strukts. No wires, nor landing ear

ever issued in the United States. Thus with no struts, no wires, nor landing gear to affect the speed, and with a carefully designed engine and propeller, the Christmas Bullet can be expected to pass 200 miles an hour without efforts and to be entirely independent of wind conditions."

American Glue 1918 Surplus Equal to \$31.44 a Share

\$31.44 a Share
Net earnings for the American Glue
Company for the year ended December
31, 1918, were \$506,127, which compares
with \$1.893,034 for the year before.
Common dividends distributed aggregated \$200,000, persing a \$144,317 surplus.

Personal Pars

Victor N. Barton has resigned as mechanical engineer, Bureau of Aircraft Production, to accept the position of sales engineer with the Duplex Engine Gov-ernor Co., Brooklyn, N. Y. He will rep-resent the company in Pennsylvania and the Southern States.

Joseph Berge, who was formerly man-ager of the aircraft division of the Champion Ignition Co., Flint, Mich., has been appointed chief engineer of the company.

George T. Briggs has joined the staff of the Sinclair Refining Co., Chicago, Ill., and will have charge of the sale of oil for lubricating internal-combustion engines. For the past 11 years he has been sales manager of the Wheeler-Schebler Carbureter Co., Indianapolis, Ind.

B. J. Cline has resigned as general superintendent of the aeronautic division, Nordyke & Marmon Co., Indianapolis, Ind., and vice-president and director of manufacturing in the Supreme Motors Corporation, Cleveland, Ohio, to accept the position of factory manager for the Templar Motors Corporation, Cleveland.

R. E. Clingan has resigned as Western R. E. Clingan has resgired as western branch sales manager of the Hess-Bright Mfg. Co., with offices at Cleveland, Ohio, and has been appointed sales manager of the Bock Bearing Co., Toledo, Ohio.

Eric S. Locke has resigned as drafting-room foreman of the Hall-Scott Motor Car Co., Berkeley, Cal. He has made no plans for the immediate future.

E. J. Hall has been discharged from the service of the Bureau of Aircraft Pro-duction with the rank of lieutenant-colonel, and has resumed bis duties as vice-president of the Hall-Scott Motor Car Co., Berkeley, Cal.

Dr. Charles E. Lucke, who during the war was director of the Navy Gas Engine School at Columbia University, New York City, has been released from Government service and resumed his duties as head of the department of mechanical engineering in the university.

James W. Macpherson, who was for-merly connected with the inspection secmerly connected with the inspection sec-tion, Signal Corps, and the Bureau of Aircraft Production, as an inspector of aeroplanes and aeroplane engines, has re-sumed his engineering studies at Cornell University.

F. Richman, former superintendent aud factory manager of the Cole Motor Car Co., Indianapolis, is now manufactur-ing manager of the Allen Motor Car Co., Fostoria, Ohio.

E. O. Sutton, treasurer of the Knox Motors Co., has been elected treasurer of the Militor Motors Co., New York City, which was recently formed by the merging of the Knox Company with the Militor Corporation



The Car of the C-5 is a product of the Burgoss factory; the Motors were built by the Union Gas Engine Co.



Celebrating Inauguration of Aerial Mail

Celebrating Inauguration of Aerial Mail The two acroplanes that took to the air on May 15, one leaving Washington and one leaving New York, are the same that carried the mail a year ago and have been constantly in the server, and they of these has been in the air 164 hours, highly 161 hours, and has carried 572-826 letters. It has cost, in service, per hour \$65.00. Repairs have cost \$480. The other plane has been in the air 222 hours, fright \$15.00 km service, per highly 161 hours, and has carried \$85.-120 letters. It has cost, in service, per highly 161 hours, and has carried \$85.-120 letters. It has cost, in service, per highly 161 hours, and has carried \$85.-120 letters. It has cost, in service, per highly 161 hours, and has cost \$1874.76 km services. hour \$48.34. Rep have cost \$1.874.76.

The record of the entire service be-ween New York and Washington shows 92 per cent of performance during the entire year, representing 128,037 miles travelled and 7,720,840 letters carried. The revenues from aeroplane mail stamps amounted to \$159.700, and the cost of

service \$137,900.06.

The operation of the aeroplane mail service every day in the year except Sunday, encountering all sorts of weather

conditions and meeting them successfully, has demonstrated the practicability of employing the aeroplane for commercial service. The service has been maintained service. The service has been maintained throughout the year with a record of 92 per cent, gales of exceptional violence and heavy snow storms being encountered and overcome. Out of 1261 possible trips, 1206 were undertaken, and only 55 were defaulted on account of weather were grautied on account of weather conditions. During rain, fog, snow, gales and electrical storms, 435 trips were made. Out of a possible 138,092 miles, 128,037 miles were flown. Only 51 forced landwere made on account of weather and 37 on account of motor trouble.

One of the lessons learned from the operation of the air mail service during the year is that the element of danger the year is that the element of danger that exists in the training of aviators in military and exhibition flying is almost entirely absent from commercial flying. Second Assistant Postmaster General Praeger, in reporting to the Postmaster General the operations for the year, says that the record of the air mail service, which includes flying at altitudes of as

low as 50 feet during periods of marked invisibility, throws an interesting light on this question.

Chicago-Cleveland Air Mail Service Started

Chicago, May 15.—The Chicago-Cleve-land acrial mail service was inaugurated on May 15 by successful flights in both

The first plane left here at 9.35 o'clock, piloted by Trent C. Fry. It was a machine of the De Haviland 4 type, carrying a mail bag weighing 450 pounds. It arrived in Cleveland at 12.48 p. m., making the trip from Chicago in three hours and thirteen minutes, including a five-minute stop at Bryan, Ohio.

stop at Bryan, Unio.

The 'plane which left Cleveland at 10.30 o'clock, piloted by Edward Gardner, took the air at Woodland Hills Park and followed the New York Central tracks to the West, reaching Bryan, Ohio. at 11.15 and South Bend at 12.40 colock. It arrived in Chicago at 1.25 p. m. The trip consumed three hours and fifty minutes.

PERFORMANC YEAR, MAY	E 0	F AVE	ATO -MA	RS F Y 15,	OR 191	THE
Pilot	Pe	rfect	For Lan	ced lings	Total	
	No.	Miles	Interrupeed	Uncompleted	No.	Miles
Lt. J. C. Edgerton Lt. Stephen Bonnai Lt. Stephen Bonnai Lt. Watter Miller. Lt. E. W. Killgore. Lt. E. W. Killgore. Lt. E. L. Boyls. Lt. G. C. G. C. Boyls. Lt. G. C. G. C. G. C.	52 39 48 41 39 35 0 97 129 73 5 4 67 45 33 6 61 26	8,175 3,375 1,035 9,242 20,324 10,858 13,700 7,634 506 436 7,314	1213202073412020000	0420020052523001321-0022232100310	53 444 52 441 377 2 13 82 191 102 138 76 103 47 47 47 44 42 55 51 65 65 29	7,153 5,023 4,966 3,786 5,643 11,483 9,243 21,482 114,422 114,423 114,



Celebrating one year of successful aeriel mail service of Washington. From left to right: Asst. Postmasier Olio Proeger, Brig.-Gen. L. E. O. Chariton, British Aerial Attaché; Post-masier-General Burleson and General Chas. T. Menoher



NAVAL and MILITARY * AERONAUTICS *



Key to Abbreviations

CRI-Report to Chanute Field, Rantoul, Illi-EOT—Report to Ellington Field, Olcott, Texas.
ELA—Refeat to Boerts Field, Loanoke,
Archanas LDT—Report to Love Field, Dallas, Texas.
RSD—Report to Rockwell Field, San Diego,
California.

Note 1-Report to places mentioned in order Note 1—Report to places mentioned in order named. Note 2—Report to U. S. Army General Hos-pital No. 12, Biltmore, N. C. Note 3—Report to Camp Travis, San An-tonio, Texas, for duty.

Ehrlichman, Rudolph I. TFT Eagle, Aubrey I. EOT Edwards, John R. Note 7

Frenna, Leo C.....

Nete 4—Report to San Francisco, Calif., erid Hospital No. 41, Fox Hills, Staten Island, N. V. Shore 3—Report to Camp Moade, Md., for Nete 12—Report to United States Army General Hospital No. 42, Spartansburg, S. C., to Rose 6—Report to Catumba University New York Care Report to Catumba University New York Care Report to Catumba University New Note 14—Report to Middletown, Pa. Science. York City, as Assistant Frotering Science. Report to Pope Field, Camp Bragg, Fayetteville, K. C. Note 9-Report to Bureau of Aircraft Production for assignment to duty, description Direction of Control of Contr

Note 12—Report to United States Army General Hospital No. 42, Spartnasburg, S. C., to Charleston Part Terminal for duty, Note 14—Report to Middletown, Pa. Note 14—Report to Middletown, Pa. Note 16—Report to Richmond, Va., to Aviation General to Part of Part of Note, Note, 16—Report to Pastern Department, New York City.

Note 17—Report to Little Rock, Ark. Note 18—Report to Newport News, Va. Note 19—Report to Director of Air Service, Washington, D. C.

Special Ordera No. 108 to 113 Inclusiva Gill, Joseph Francis......IIHN Albrook Frank P. Note 17
Andrews, William V. Note 19
Arnold, Henry H. Note 4
Ames, George P. Note 5
Albright John W. Note 18
Ayres, Verne U. E.LA

Icenhower, Fred J......Note 5
 Cameron, Burr S.
 Note 6

 Collier, David C.
 Note 8

 Caliborne, Harry C.
 EUT

 Carter, James E.
 Note 19

 Coleman, John M.
 ELA

 Canfield, Dwight J.
 Note 11

 Concy, William D.
 ELA

O'Brien, Matthew H Note 5 Pye, Walter D......Note 19 Ryan, Robert E......ELA
Rady, William J......Note 5
Rumney, Raymond C.....ELA

Slade, William CRI Sutton, Sephus Note 14 St. Clair, Gordon C CRI



Recent Naval Orders Lieutenant (junior grade) Charles B. Dushane, to duty naval air station, Pensacola, Fla.

Licutenant (junior grade) M. E. Jensen, to duty commanding officer U. S. N. Aviation Re-pair Hase, Queenstown, Ireland, in connection nucleus crews.

Lieutenant Henry U. Linkins, to duty Naval Licutenant Augustus M. Baldwin, to duty air station, Miami, Florida.

457 Loops with Passenger New World's

Record

Washington, May 19—According to a statement issued by the Department of Military Acronautics a new world's looping record was established at Carlstrom Field by Licutenant Rajh J, Johnson, who has many unrecorded stunts to his credit. He was accompanied by Second Licutenant Mark R. Woodward as a passenger. Johnson made 457 continuous Lieutenant Mark R. Woodward as a pas-senger. Johnson made 457 continuous loops in his Lapere Fighter in one hour fifty-four minutes and ten seconds. His elevation varied from 6,000 to 4,000 feet.

Flying Fields to be Retained Fifteen flying fields and five halloon schools are to be held by the Air Service as permanent training fields.

as permanent training fields.
Reck-PUNG FIELDS
March Pung Fields
Reck-PUNG FIE

Balloon Schools
"Government Owned"
Balloon School, Lee Hall, Va.; Balloon School,
L. Crook, Nebr.
"Leased—to be purchased"

Balloon School, Arcadia, Cal.; Balloon School, San Antonio, Tex.; Balloon School, Ft. Omaha, Nebr.



Three famous aeronauts meet for the first time et the Aere Club ol Dayton. Left to right: Orville Wright, Capt. Eddie Rickenbacker and Major Schroeder

U. S. Navy Will Release All Temporary

Washington, May 13.—All temporary officers who entered the navy for the war period only will be released within the next few weeks, Acting Secretary Roosevelt announced today. There are more than 1,000 officers in this status and they will be replaced by reserve officers who are accepting temporary commissions with the agreement to remain in its declared.

Figures for Manufacture of Service and Training Planes for Allies Given Out (Prepared by Statistics Branch, General Staff, War Department)

Data for the plane production of France, Great Britain, and Italy for the period January 1 to October 1, 1918, show that service planes constitute 79 per cent and training planes 21 per cent of the

The following table shows the production and percentage distribution for each of the principal Allied countries:

	Service	Training		Per C	Train.
Country teals France	2,507 15,326	Planes 421 3,507	Total 2,928 18,833	Service 86 81	14 19
Great Britain	17,854	5,655	23,509	76	24
Total	35,6 47	9,583	45,270	79	21

Army Issues Call For Flight Surgeons

Washington, D. C.—The Air Service now requires that a flight surgeon be detailed at each of its 15 active fields. Owing to the discharge of a large num-

ber of temporary medical officers, the Air Service needs a number of medical officers of the permanent establishment as the grade of licutenane-colonel, who desire duty of this character, should communicate with the Chief Surgeon, Air vacancies from among those who voluter. Authority has been granted medical officers to become pilots if they pass the such receive the C.2 per cent. Hying pay.

Air Service Demobilization

The net decrease in the total commissioned and enlisted strength from the date of the armistice to April 17 was 69

per cent.

The following table shows the present distribution of personnel as compared with November 11, and per cent of net decrease. The April 17 figures do not include 514 men at demobilization camps wasting discharge.

awaiting disch		HODITZA	tion camps	N
	Nov. 1t	Apr. 17	Per cent net decrease	II.
Cadets	5,775	824	86	F
Officers	20,586	51,384	70	A
Total	190,627	58,428	69	Λ

gram	1:													U.S.	Overseas
Nov.	31.					ı,			ı					111,846	78,786
Dec.	2						ı,				ì			115,216	78,061
Dec.	26.					ı,	ı,		ï		ı			99,010	59,917
Jan.	30					ı,		ı	ı,		i	ú		46,919	57,527
Feb.	27		ı,				į.		d	ı,		i.		33,649	53,087
Mar.	28				d	d	ı,		ı	ı,				25,347	41,800
Apr.	10					ı								20.636	40.855
Anr.	17													17,753	40.431

69 Per Cent of Present Air Service Personnel Overseas

the Air Service personnel overseas decreased 424 men as against a weekly av-

erage of 2,208 during the nine preceding weeks. The strength of the Air Service in the United States and overseas is shown for various dates in the following dia-

During the week ended April 17, 1919,

THE PROBLEMS WHICH CONFRONT THE AIR SERVICE

N an address delivered before the Southern Aeronautical Congress at Macon, Ga., Major General Charles T. Monoher, Director of Air Service, spoke as follows:

In order to give an idea as to the problems which confront the Air Service, and the aims and objects in view, I will quote extracts from various public uterances made in the last two months by the present Director of Air Service.

"Now that peace has come and the various activities disturbed by war are re-

"Now that peace has come and the various activities disturbed by war are returning to normal channels, we may look for a steady flow of conservative development. We, I believe, would like to see the United States, where aviation had its birth, gain and maintain the lead in aviation. To do this will require the co-operation and co-ordination of all our activities

and resources. "Because of the lead given the Air Service of the War Department by the enforced effort due to the war, civilian scriptics," and in the governmental caparities, and in the governmental caparities, its sure to look to the Air Service for assistance for some time to come. This places upon the Air Service an obligation of assistance and co-operation in carrying on the work. This, I believe, is a fortunate circumstance for obligation, creece, provided it fulfils its obligation.

"It will be the endeavor of the Air Service to fulfill these obligations as far as possible, subject to the limitations of Congressional appropriation. The acceptance of such co-operation and assistance by civilian activities should carry with it a reciprocal obligation, and appeal is hereby made for such reciprocal obligation.

"It will be in the matter of research and development of material that we must look in the future to civilian activities, unless Congress should appropriate for this purpose more liberally than we have mow reason to hope for. The Art Service move reason to hope for, the Art Service has been been considered to the private manufacturers to develop new and improved types and at the same time carry on its own work along these lines as far as possible. " " Within the Air Service itself there must be lines as far as possible to a " Within the Air Service itself there must be present position of advantage, it should be able to lead the way in most phases of air activities. It should never be con-

tent to simply maintain its existence."

Again, "Of the many problems pressing for solution in the general field of aeronautics, the most urgent is that of proper and adequate rules and regulations for the navigation of the air. First and foremest among these rules should be those covering mainters of qualifications (Continued on page 554)

New York's Aerial Polici Asiaters, in the



FOREIGN **NEWS**



British Firm Adda \$10,000 to Trans-Atlantic Prize
In order to encourage the trans-Atlantic flight, the Ardath Tobacco
Company of England have added 2,000 guiueas to the prize offered under
the Roral Aero Club rules.

French Gavernment lasues First Civilian Licanse Mille. Jane Berven, who was one of the first laties to secure a pilot's certificate, has received permission to resume flying—the first civilian, it is said, to be so honored in France since the armistice. She is at present practicing on a Caudron at Issyles Moulineaux.

Could be a Country in the Proposition of the Country in the Countr

Afghan Riotera Quieted by Aerial Bomhardment
London.—According to news dispatches dated May 12, the British
bave driven the Afghans from Ashranishkel and aeroplanes crossed the
frontier and bombed the enemy position at Loidata with good results.

Bristol Piana for Flim Delivery
One muccassful use of the aeropiane for commercial purposes is that
of the Bristol fighter, piloted by Capt. A. M. West, R.A.F., which is
cragade on delivering Harms films to various provincial towns including
is also being used to distribute leaflets advertising the films. The usual
load is 6,000 fect of film and 30,000 teaflets.

Cortines Recrosses Andes

The Chilean pilot, Lieut, Cortines, who crossed the Andes in a Bristol aeroplane recently from Santiago and landed at Mendoza (Argentina), has recrossed the range on his return to Santiago, the journey occupying two hours. Lieut, Cortines reached a beight of over 20,000 feet, Sevan Airways and 120 Aerodromes for Civilian Aviation in England

Seven artways and 120 Aerodromes far Civilian Aviation in England Lendom, May 14.—The commercial air stage has been officed Civilians are traveling on seven great airways, radiating from London to all garts of the United Kingdom and to points outside. One of the Civilian are traveling on seven great airways, radiating from London to all the disposal of commercial air traffic, thirty-four main serrodromes being opened at once.

Marine Cerp. Aviture Us. Tear Can Bomba on Mailina Bondis. In order or saw kandles of Han and Samo Domingo a morreader without the employment of large numbers of troops and annecessary bloodshed, Marine Corps aviations have been directed to undertake a terrorism. "All so affect the natives by appealing to their superatitions and cause them to surrender without further significant to surrender without further significant superatitions and cause them to surrender without further significant superatitions.

Permanent International Aircraft Standards Commission Being Formed

Permanent International Airgraft Standards Commission Being Lendon.—The accessity for grane of an international body, with direct government ecooperation and official recognition, for the study of industrial aerosantics, and the setting up of international standards being the control of the standard of the control of the standard of the American designation, and the American designation of t

At the October conference eleven international advisory committee memory and the conference of the preventions which separated managing to history control of the conference of the effective and technical satisfacts between the conference of the effective and the conference of the c

It will be seen, therefore, that the commission has been entrusted with a task of the greatest importance, a fact which is fully realized by the Allies, for besides the countries cited above as co-operating in the work, the Japanese Government have agreed to form a committee and there is likeholood of Belgiain representation shortly.

Amsterdam Aeronautical Exposition Under Auspices of Dutch Officials

Officials

Ansterdam, Holland—During the months of July and August there will be bell at Amsterdam, Holland, an international Aerosaurisia Excellent and Rotterdam, as well as the Secretaries of the Internet Water and August the Secretaries of the Internet Water and Secretaries of the Internet Water Secretaries of the Internet Water Secretaries of August Secretaries of the Internet The Internet Secretaries of the Royal Durich Austration for Aircraft. The Internet Secretaries of the Royal Durich Plijus Corps, With section proposed of members of the Royal Durich Plijus Corps, With section proposed of members of the Royal Durich Plijus Corps, With section proposed of members of the Royal Durich Plijus Corps, With section proposed of members of the Royal Durich Plijus Corps, With section Plant Section 1 and Section 1 and

Brigadier-General Duval New Franch Air Chief According to a decree of April 15th, Colonel Dhé has been replaced in e office of Directeur de l'Aeronautique Militaire by Brigadier-General the office of INTECESS OF A CASES AND A CONTROL OF A CONT

Braguet, Bleriet and Caudron in Huga Aero Transport Combina

Braquet, Bleriet and Casiden in Huga Ares Transport Gusbian Grand Control of the Company of the Company of the Company of the Company of the Research Arriennes, with June capitalisation for the grandest on of all forms of availation in France, French cohornes and marchandise and passengers.

The officer of the concern are Avenue Ribber, Paris, and his first and the Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Morane Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and the Morane Marie Saulier Conquary gazet, Joseph Briton, Kené Caulein and Conquary gazet, Joseph Briton, Kené Caulein and Caulein a

France Doubta German Commercial Aero Plans Have Na War Aim Paris, May 10—"The air should have become the property of the League of Nations," says Le Matin, in calling attention to the fact that in the peace treaty handed to the Germans no reference was made the building and equipment of aeroplanes by Germany for civilian pur-

"What difference is there between military and bombarding aviation and civilian flying? Civilina aviation lends itself to all sort of camous flage. A peaceful postal acrophane or a passenger machine can easily and rapidly be craamed with explosives and article with machine puns. In a rapidly be craamed with explosives and article with machine puns. In a contract of the contract o

tion centres."

Then after pointing out the greatest danger from such transformation of aerust services for France, Le Matin, puts forward the following conference of the properties of the pro

Aerial Progress Forced Canadian Pacific to Enter Aero Transport Field

Enter Ares Transport Field

"When we consider that exe as proposition as receipted in air removation, the Canadian error great in air removation, the Canadian is only asturia," is the way Grant Hall, when the consideration is or rapid that it is incumbent on the CFR to proposite outer the field, "prained and air and the consideration of the consideration of the consideration of Canada, with their absolute lade of for and Canada, with their absolute lade of for an extra consideration of the considerat



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. M. Mahon E 272 (30)



PACIFIC NORTHWEST MODEL AERO 921 Revenue Boulevard, Seattle, Wash.
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Prizes for Model Aeroplane Contest

ERIAL AGE has decided to award two sets of medals and a beautiful cup for the coming contests, to be de-cided during the mouth of June.

These medals of gold, silver and bronze are to be awarded

to the first, second and third in each racing model aeroplane

The cup is very neat, and the winner of the scale model construction contest will have something he will be proud of construction contest will have sometiming he will be proud of for years to come, as he will not alone possess an enviable prize, but he will be the owner of the finest model in the United States. This is an absolute fact, because some of the most expert model builders have signified their intention of competing in this event.

It makes no difference which contest is held first; the only thing necessary is to have at least five competitors in each event of the flying contests and these five competitors need not live in the same town or city, but they must compete during the same meeting.

The construction contest will be decided by the builders of The construction contest will be decided by the builders of such models sending in clear photographs, together with a such models sending in clear photographs, together with a The best of these photos and descriptions will be used later in ABERIA AGE for the benefit of the readers.

To conduct the flying contests, it is necessary to have the flights witnessed by some influential citizens in, your city or

town, and if you have a branch of the Aero Club of America in your city, invite a few of the members to judge and witness the flights.

the tlights.

The Illinois Model Aeroplane Club and the Aero Science Club of Chicago and New York respectively will no doubt have teams in the contests, and I look for some competition between these rival clubs.

The Illinois has had the better of the New York contingent for the past couple of years, but from what Mr. S. Y. Beach of the latter club bold me a few days ago, the Illinois club will read the past couple of the latter club bold me a few days ago, the Illinois club will read the latter club bold me a few days ago, the Illinois club will read the latter club bold me a few days ago, the Illinois club will read the latter club bold me a few days ago, the Illinois club will read the latter club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club bold me a few days ago, the Illinois club will read the club wi

have to travel some if they win any of the above prizes.

I should not be surprised to see some dark horse come through and beat the members of both of these big clubs, as Inrough and beat the memoers of both of these big clubs, as I have received many photos and reports of wonderful models and their long flights from out-of-the-way places. These are the people we will no doubt hear from The Texas boys have gained considerable knowledge since the Aviation Section opened up new fields there during the war, as have the California and Florida boys.

Readers as far off as the Hawaiian Islands are entered, so the winners will be real champions in their respective events.

the winners will be real champions in their respective events. The prize winners will be invited to send their photographs, holding the winning model, to the Model Editor of Arbana. Arez for publication, after which the prizes will be awarded. We hope to have another such contest for water machines later in the summer, and owing to the difficulty of successfully launching a model from the water, these contests should be as well contested as the hand launched and ROG, events.

To conduct a contest successfully proceed as follows:

Have a judge for the measuring of the distance or for
taking the time of flight. (If a distance contest, the distance taking the time of night. (If a distance contest, the distance that the models lands from the starting point is measured in a straight line, regardless of the circles the model might make. This distance is measured with a steel tape or a cyclometer working on an accurately measured disk or wheel. This cy-

clometer is mounted on a forked handle, to which is fastened a wheel two feet in circumference. Two pegs directly opposite each other are fastened to the wheel in a position to strike the cyclometer and register each revolution Each revolution registers twice, thereby showing a distance of two feet, Jennings Machine Works Announces New Catalog

The Jennings Machine Works, Uniontown, Fa., announce a new catalog for Ford Motored Aeroplane Fittings, also a fulfill fine of parts for light plane construction. They also do general machine work in the way of engine rebuilding and general machine work in the way of engine rebuilding and The fittings turned out by the above company have been examined and tested by the writer and have proven entirely satisfactory inasmuch as they follow out the designs suggested in the Ford Motored Aeroplane articles which appeared in APREAL ACE recently. It would be worth while for any one contemplating building a Ford Motored Aeroplane or other light machine to write this company for their new price list.



The model shows is the accompanying photograph and constructed by Mr. Wallace A. Lauder of This model flew a distance of 3,537 feet, when hand, making a new world's record, in 1916, W stached the model has made flights of over 100 This is the type of model that will be used in the



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has physically. At times it has a pathologic, at times merely a psychologic foundation. affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

David McK. Peterson (Major A. S. (M. A.) D. S. O. Killed in Aeroplane, Daytona, Florida March 16, 1919

So much a warrior, relatived to wings He climbed the blue-shot, blood-swept steeps of war To battle for the requiem of kings— So much a Thor!

So much a man, he bore in dignity His honors; masked their colors rather than Displayed, and courted anonymity— So much a man!

So much a friend, so kindly and sincere, So reverencing truth, so quick to bend Regard to this of smile, to that of tear o much a friend!

So much a Son born in a deathless love, So much apostle—oh, this earthly one— God must have felt the need of him above— So much a Son!

Sgt. Roy Harris Russ.

(David McK. Peterson, a Major in the Air Service and rated a Military Aviator, winner of the Distinguished Service Order, was killed in Daytona on March 16, 1919.)

"Do you hire aeroplanes here, sir?" asked the shy-looking

"Certainly. What do you want one for?"
"To look for a servant."

"But wouldn't you be better able to get one at a registry

omeer "No," replied the shy man; "not the one I want. I want to look for our own girl, who tried to light the kitchen fire with kerosene."—From Aircraft.

Mother Goose Revised

Little Jack Ladd, sat in a Spad, To see how the derned thing worked, He reached out his thumb and pulled back the gun (10,000 dollars gone home to the folks.)

Hey diddle diddle, the prop and the fiddle The Liberty flew over the moon The 15 looped to see such sport And the 23 ran away with the spoon.

We Agree With You

"I hear you are going to fly the Atlantic, Jones?"

"But don't you think as a Britisher it would be better to start from this side?"
"Not on your life. Since they've adopted prohibition in the States the incentive to get away will be stronger,"—Aircraft.



-From N. Y. World.

EVERY FIRST (LASS AEROPLANE REQUIRES A RETRACTABLE CHASSIS 🖑

MOST REARWARD C.P.

EVERY FIRST CLASS AEROPLANE REQUIRES A RETRACTABLE CHASSIS

RESISTANCE AND COMPARISON OF OF K-BAR AND DOUBLE LIFT TRUSS SYSTEMS



The following is an exact Comparison of Resistance and Weight:



The K-bar Truss reduces interference by eliminating interplane struts and wires and also by affording increased Gap cord ratio.

At a speed of 100 M.P.H., Wing loading of 9#/sq. ft., Safety factor of 8.

Aspect ratio of 6,

Truss.

Gap/chord ratio of K-Bar Truss...1.143
Gap/chord ratio of Double Lift Truss...1.000
97.2

Normal C. P. near central wing bar, only light forces at most rearward C. P.

FORWARD C.P.

Resistance of K-Bar Truss is

Double Lift Truss. Weight of K-Bar Truss is

- = 72.7% weight of Double Lift

RESISTANCE AND WEIGHT OF memoer
inner Panel Lift Wire
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inner Lipper K-Bar
inner Lower K-Bar 154 68 96 56 56 56 .2 1.76 1.32 .34 .583 .243 .535 RESISTANCE AND WEIGHT OF DOUBLE LIFT TRUSS SYSTEM

# .1 .55	DRIFT WIFE FROM LEADING EDGE BAR TO REAR WING BAR	TURNING THIS BAR ALTERS INCIDENCE OF UPPER PLANE
.6 .5 .7 .2 .7 1.4	FORCES EQUAL: AND OPPOSITE NO BENDING	ARROPOLL-OPENSTERN I SCALE 3 FEEY
# 7.7 8.8 8.4 8.72	MOMENT IN	TURNING THIS BAR ALTERS INCIDENCE OF LOW PLANE

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(Continued from page 529)

meadows between the resort and the mainland towns, meanows between the resort and the maintain towns, and record time for the ten-lap is expected to be established with eight colleges vieing for honors and a share in the cash prizes offered under the terms of the will of Mr. Samuel II, Valentine. This competition does not endanger the amateur status of the competitors.

ateur status of the competitors.

The new entrants for the event, which is the second of the big series plaumed by the Pan-American Aeronantic Convention, are Lieut. D. Greeg and Ensign Marion Sulsacional Convention, are Lieut. D. Greeg and Ensign Marion Sulsacional Convention of the Convention of the Convention of the Convention of Dartmouth College; Ensign Alfred A. Beckwith, of Yale University, and Melvin W. Hodgdon, flying the colors of Tufts College. Lieut. Ferd Elbe and Ensign Charles H. Payne will represent University of Pennylvania; Lieut. G. W. Shaw, U. S. N., New England Conservatory of Wisci, and Eletu. Jack Foxt, Columbia, and Conservatory of Music, and Lieut, Jack Frost, Columbia, and Augustus Fost, of Amberts College, will make their second attempt for the "expense money." The many scientific addresses and acrial transportation charts and tables exhibited at the Second Pan-American Aeronautic Convention and Exposition.

Testimonials to Trans-Atlantic Flyers

The news that the NC4 had arrived safely in the Azores was lustily cheered by the delegates of the twenty-two nations attending the Second Pan-American Aeronautical Convention. The guests arose as a unit in tribute to the daring vention. The guests arose as a unit in tribute to the daring crew which accomplished the task, and burst out in enthusi-astic cheers for Commander Read and his associates. Colonel William A. Bishop, the Canadian ace who is officially credited with bringing down 72 German planes,

was among the guests at the luncheon.

Commenting on the trip of NC-4, President Hawley said:
"The successful flight of the NC-4 to Horta, in the Azores, is indeed a marvelous achievement, and reflects the greatest possible credit upon the United States Navy and the intrepid navigators of the winged ship. It presages successes in the achievement of the dream of man, to bridge the Atlantic. Doubtless the NC-4 at least will finish the journey in one

more leap to Lisbon. nuore leap to Lisbon.

"As President of the Aero Cith, I extend my heartiest conraduations to the United States Naxy, and to the American
has demonstrated the value of the navy Liberty motor and
has vindicated that highly valuable piece of mechanism,
despite the early criticisms which were directed against it."
Henry Woodhouse, Vice-President of the Aerial League
of America, and author of the texthooks of military and

naval aeronautics, said:
"The crew of the transatlantic fliers are the pathfinders "The crew of the transatlantic fliers are the pathinders of a new age. Inventions, particularly inventions that have increased the speed of transportation and intercommunication, like the steamship, the railroad, the telegraph, and the telephone, have changed world conditions socially and commercially. The advent of the steamship made the Atlantic the central basin of the world, succeeding the Mediterranean. Yet all of these inventions in their early stages hardly held as much promise of usefulness as the aircraft does today. Captain Robert A. Bartlett, the explorer, a delegate to

for twenty-four hours in the day. To the unbelieving Thomases, this transatlantic feat should convince them that

the flying boat has come into its own just as the steamboat did. It is a glorious event, and I trust it will stimulate deeper interest in my polar flying trip.

(Continued from page 533)

it has a capacity of 180000 cubic feet. Cruising speed, 42 M.P.H.; climb, 1,000 feet per minute. M.P.H.; climb, 1,000 feet per minute. More than 1,000 feet per minute and feet long, 5 feet in maximum diameter, with sale tube outrigers carrying an engine at either side. Overall width of outrigers, 15 feet. Complete weight of car, 4,000 pounds.

Seven passengers may be carried, but the usual crew consists of four. At the front, the coxswain is placed; his duty is to steer the machine from right to left. In the next compartment is the pilot, who operates the valves and controls the vertical movement of the ship, and aft of the pilot the mechanicians controlling the engines. At the rear cockpit is the wireless operator.

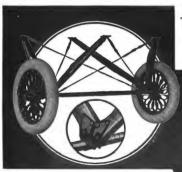
The engines were made by the Union Gas Engine Company and are 125 H.P. each.



Out of our War Production of 25,000 Paragon Propellers one third was furnished to the Royal Flying Corps. They were designed by us and made on honor by our own methods with no inspection until finished. We know our part of the business. Our customer had confidence in us. The results proved how well that confidence was justified—only four final rejections out of eight thousand propellers—more speed and faster climb than any other design.

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See Tork, May 10, 1919.

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is enser to your telepathically-received (acctai) inquiry. *[g 77,150 M871' would say that according your inquiry immediate distantion efforts the stite much pleasure. In that he has been existly and successfully associated with furgies acrossitual materials and progress ento: 1512, and Assertan time 1511.

During 1913 and 1914 the writer personally supervised passenger flights for virtually all of Shakespeare's "form Ages of Mea" -aed Bosan. The latter embraced earled tripper enough from practing beby girls of three years to dear old latter of 75 and 82 years of Mes.

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nce the better appreciate that flying IS cofe, provided, or you have a cofe modius. Fould you like to know shy the INFO-ENTED is a SAFE Excellent Accessed also say it 'fits well

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SETIE

(Continued from page 547) and licensing of pilots. The rules should cover also such activities as general intercover asso such activities as general inter-state flying, coast defense patrol, postal service, forest patrols, commercial pho-tography, aerial transport service, sports and recreations, exploration, night flying, police service, smuggling and incendiarism.

"On account of numerous and urgent requests from various sources throughout the country for assistance in the matter of exhibits and flying exhibitions, it was found necessary to announce some policy in regard to participation by the Government in such activities, and the following policy in regard thereto was announced.
"The Air Service will give favorable consideration to any project of this sort which has for its object aerial performances without remuneration, for develop-

ment, charitable or co-operative purposes of any international, national, state or or any international, national, state or civic character, but must adopt as a War Department policy disapproval of any project which involves competition of Air Service teams or individuals with private clubs or enterprises for money or other prizes or trophies" Again, "It is considered an improper use of the time of flyers and of Government property to compete for purses and individual prizes."

In line with the policy previously an-nounced regarding encouragement to private manufacturers, it has been stated on numerous occasions by the present Director of the Air Service that we are derous of doing everything that is possible and legitimate in the way of encouraging manufacturers who have built up numerous plants during the war to "carry numerons prants during the war to carry on "in the future. This is a difficult ques-tion to deal with. Unless we can give adequate orders for new planes, these manufacturers will have to go out of business as aeroplane manufacturers.

Again, "If we do not have adequate appropriation for new orders, no progress in the way of improvement in type is possible. It can readily be seen how closely these two ideas are linked up together and how necessary it is to have a continuing policy, and financial assistance to carry out such policy. It is not desired nor is it considered desirable that the Government itself should undertake the manufacture of planes or engines in quan-tity. This must be left to private manu-

What it is aimed to do, however, in this line is to establish and maintain an adequate technical engineering establishment where all kinds of experiments may be carried on, where we can even build experimental engines or experimental planes and the facilities of which can be placed at the disposal of investors in carrying on their work. This technical engineering center is now practically an accomplished fact. Then we aim to have a complete engine production plant, to be held as a matter of insurance against future contingencies, such plant not to be used for production by the Government except in time of great emergency, but to be avail-able for such emergency or to be avail-able for use by private manufacturers under contract in case the Government desires to place orders for engines. Such a plant is already available, belongs to the Government, having been paid for during the war. Such a scheme would during the war. Such a scheme would save to the Government amortization charges in the future on any such concharges in the future on any sinch con-tract as that referred to. The cost of maintenance, while idle, of the plant in question would be only nominal, but as a matter of insurance is of far-reaching advantage. It is aimed to do the same thing in regard to a plant for manufac-tured planes.

The foregoing will indicate in a very general way some of the problems con-fronting the Air Service and its policy in regard to civilian and commercial acin regard to civilian and commercial ac-tivities. I may say incidentally that this Congress is the kind of activity with which we desire to have full and complete "liaison." We are now in close liaison with the Navy Department and the Post Office Department, and it is to one phase of our co-operation with the Post Office Department that I now desire to invite your attention.

One of the aims of the Air Service is to prepare and publish for the benefit of the public at large guide books, road maps etc., similar to publications of that kind for the guidance, etc., of automobil-ists. Considerable work along this line has already been done, as may be seen by an examination of charts on exhibition at the Air Service Exhibit. The ultimate aim is to have the entire country charted and road maps available for the use of pilots—the whole system to form a com-plete network linking up all the im-portant centers in the United States. In considering this question the idea at once occurred that there was no better oppor-tunity to make use of the aerial mail service than this, and steps were taken to get in touch with the Post Office Depart-ment through the 1st Assistant Postmaster General, Mr. Otto Praeger. The logical way to extend this network

of aerial routes seems to be to munici-palities conventiently and properly located to take up the matter and assist in this great work; to designate and set apart adequate landing fields for the use of the Air Service in eross country work, the mail service in handling the mail; and for the use of itinerant pilots. Such a scheme if carried out will serve many (Continued on page 558)





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Equipped with 80 h. p. Le Rhone Engine.

High speed, 90 M. P. H.

Landing speed, 35 M. P. H.

Climb 6,700 ft. in first ten minutes.

THOMAS~MORSE AIRCRAFT CORPORATION

ITHACA, N.Y.U.S.A.



(Continued from page 554) purposes. It will not only fulfill the purposes just named, but will place the clies concerned "on the map," so to speak, and will pave the way for local benefits resulting from the development of intersection of the purpose of the pur

later. Idea in this matter is to call upon certain municipalities to set aside landing fields under conditions which have been prepared and are now ready for distribution; that when so designated the field will be examined by representatives of the Air Service, the field and vicinity photographed, and then the facilities, which will be necessary at each field, installed. It is not my purpose to go impose the properties of the field of the field will be extended to the field and the field will be not so that the propriets to go impose the field one of my assistants to present to the Congress at the appropriate time.

the Congress at the appropriate time.
On account of the magnitude of this work and the claims that the various priority, it has been considered necessary not to include all cities throughout the country at which we ultimately desire to establish landing fields, but to undertake just now only a limited part of the work, —to provide a skeleton, so to speak, of lare retwork, then to fill in the details

The following list of towns has been selected as the ones where we want to establish these fields in the first instance. It will be recognized that some of these are relatively unimportant in size, and perhaps commercially, but they were selected, more on account of location than commercial importance. The Government also desires to confine itself at present to

cities where the aerial mail service requires stations or where they are required for the cross-country use of the Air Service. It is not intended that such limitations should in any way restrict the establishment of other landing fields at cities and towns where conditions warrant such action. These cities are:

Roston, Masachuestis Faltonia, Texas New York City, N. Y. El Paso, Texas Kethmond, Virginia Texafanana Texas Oklahoma City, Okla Kisismmee, Florida Hongari, Arizona Raleigh, N. C. Augusta, Georgia, Macon, Georgia, Wacon, Georgia, Wacon, Georgia, Syracuse, N. Y. Albany, N. Y. Wanson, Georgia, Syracuse, N. Y. Albany, N. Y. Kansas, Giy, Mo. New Chang, La. Beaumont, Texas Cincigo, Ill.

The important additional purpose which there landing fields will serve, and to which reference was made a little while ago, is this: We desive to keep together as far as possible, at least to keep in total pilots, mechanics, etc., who have had service during the war. These municipal landing fields it is believed will serve the anding field in it is believed will serve the of the classes of men just referred to and the aim of the Ari Service is to establish in each one of the communities, where the hading field in similatinacle, a reserve the landing field in similatinacle, a reserve landing the communities, where I facilities for instructions and practice in flying, observing, care and repair of ships, and which would be so organized as to genery. This I consider one of the most

important phases of this whole proposition of the municipal flying fields, and the co-operation of every one concerned is earnestly requested.

The Sturtevant Engines

(Continued from page 538)
perature around all parts of the cylinders.
The water pump has been so designed as to permit easy adjustment of the packing gland.

Thermostat

Surrecurrent and the control to control the temperature of the cooling water. This very important device has been worked out after many months of experimentation by Sturtevant engineers. It is mounted as an integral part of the engine. The Sturtevant engineers are all the control to the con

Tachometer

A tachometer which gives accurate readings and which shows no vibration of the needle is supplied either with or without a positive revolution counter for checking purposes.

The engine has been arranged to permit of the application of an efficient air starter if desired. Any other suitable starter may be applied.



Vol. 9, No. 12

JUNE 2, 1919

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Laugh and the World Laughs With You

Atlantic City Convention Has Aroused Nation-Wide Interest in Aeronautics

We urge airplane manufacturers to compare the performance of AC Aviation Plugs with the performance of other makes of plugs. The United States Government staged a series of such competitive tests which resulted in the adoption of AC Plugs as standard equipment on all Liberty and Hispano-Suiza airplane motors during the war. As you well know, most makers of fine motor cars have used AC Spark Plugs for standard equipment for years.

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D. R. Pal No. J. ISSUET. April 11. 1004. Palma No. J. ISSUET.





No. 12



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A few cents "saved" on the cost of a part costing a few dollars may cause the failure of a machine costing thousands of dollars. It is no unusual thing, in mechanism, to find a major responsibility resting upon a minor part. From which it appears that there is no such thing as a "minor" part.

> "NORMS" Bearings are among the smallest parts in the smallest items of equipment used on airplanes, cars, trucks, tractors, and power boats. And their proved capacities for maximum service has made them the standard bearings in practically all ignition apparatus and lighting gen-erators internationally identified with maximum-duty automotive units.

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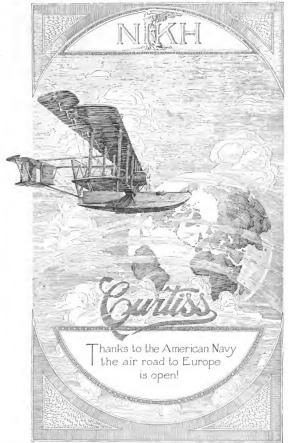
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WEEKLY

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VOL. IX

NEW YORK, JUNE 2, 1919

NO. 12

MONTH'S CONVENTION AT ATLANTIC CITY HAS AROUSED NATION-WIDE INTEREST IN AERONAUTICS

HE month's Convention and Exposition, held under the auspices of the Pan-American Aeronautic Federation, Aero Club of America, and Aerial League of America, has aroused nation-wide interest in aeronautics, and has been a very great stimulous in showing to business interests and government departments ways and means of utilizing aircraft effectively in peace time.

Aviation Insurance

ONCLUSIVE indication of the arrival of aeronautics in CONCLUSIVE indication of the arrival of aeronautics in the commercial stage is given by the recognition that has panies to-day writing all kinds of insurance on aerophanes, according to peakers talking on the passengers and pilots, according to peakers talking on the Pan-American Aeronautical Convention.

Lientenant Charles H. Payne, U. S. N., who has written insurance on all the planes now operating from the local airport and other flying stations here in checking up figures on the record accomplished in the reduction of accidents, de-mercord accomplished in the reduction of accidents, de-

clared that from 1908 to 1913, both in military and civil aeronautics, 60 per cent. of the casualties were due to the col-lapse of the plane, as the result of faulty construction, while from 1913 to date, only 2 per cent. of the casualties were caused by the collapse of the plane. Of present-day accidents, according to the insurance expert,

approximately 40 per cent, are due to tail-spins entered into too close to the ground or by inexperienced pilots who are unable to extricate themselves; 25 per cent, through lack of judgment in landing, 10 per cent, to forced landing caused by motor trouble, 2 per cent, by fire, 2 per cent, by collapse of the planes, and 22 per cent, by lack of judgment in various maneuvers by pilots still in training.

Among the stipulations in the aviation insurance is a clause which declares damage must be in excess of \$200 to the plane before the underwriters become liable, this being done because the snapping of a strut or some small part of construction is common. Predictions were made by Lieutenant Payne that inside of six-months aeroplane insurance will be even cheaper than automobile, because of the safety establishment of fields with devices aiding safe landing under adverse conditions. and the mapping out of airways and air routes.





The Second Pan-American Aeronautic Convention Night Flying Problems

REALIZING that night flying is to play a big part in the impending commercial era of aircraft, the second Pan American Aeronautical Congress turned the searchlight of science on the illumination of air ports. Taking advantage of the convention here of the National Electric Light Assoof the convention here of the National Electric Light Asso-ciation, the aeconautic authorities held a special conference with the electrical wizards, who were headed by A. E. Ryan, the man who made the Pan American Exposition at Frisco a "brilliant" success. Major Thomas Baldwin, who is in charge of the port here, led the aero heads.

Co-operative action toward special tests in working out standardization of aviation field illumination were programmed by the conference, the experiments to be made at the great Atlantic City Air Port immediately. What conclusions are reached will serve as the sample for the fields and ports

throughout the country.

The problem as it was brought out at the conference, is essentially different from that developed in the marking of essentially different from that developed in the marking of fields for war purposes. Under the latter conditions the question was one of concealment by camoullage to prevent discovery of the aviation areas by the enemy while the ques-tion now under consideration is one of "antiflage," or making the fields distinctive. Even at the aviation training bases in this country there were no standard plans of marking the land points at night, a simple flare being the only method to followed.

The plan under consideration by the conference had to do with the illumination of the terrain to a sufficient degree to bring out all its features—the runways, ground hazards, wires, buildings and the sort, together with the limitations of the field so that the flyers may know just how much elbow room

they have.

One of the hardest problems will be that of making the air port illumination contrast with the lighting of cities, especially port illumination contrast with the lighting of cities, especially where the fields are located within a populous centre. The plan suggested to cover this was the tinting of the field illumination and the establishment of aerial "lighthouses" that would flash signals in much the same manner as the coast system works out to water navigators. Each field will have its own code, so that the sky navigator by referring to his chart can discover his postion as easily as the skipper of watercraft. It is also proposed a microphone arrangement in the lighthouses so that the 'kepper' constantly on duty, may detect

lighthouses so that the "keeper" constantly on duty, may detect the cloud marine when he comes within a given radius and be able the gign may be considered to the cloud considered to the constant of the con

ing, making an arrow formation.

All the illuminants on the ports will be worked from the indirect system, so that there will be no glare in the eyes of the pilots. The line system of lighting for the wind direction will be from pits so that there will be no obstruction on the surface of the field.

The wires will all be buried, and in lighting any buildings the illumination will be by projected lights from outside points in order to cut down the fire hazards, especially in

hangars for dirigibles.

The lighting of the aeroplanes as an additional factor considered as a safety plan. It is proposed to have the planes carry lights port and starboard the same as any other yessel, and tail lights to give other flyers the tip on direction. Powerful projected lights beneath the aeroplane that will enable the pilot to skim over a field and by playing his lights on the terrain below discover just what is there, will be perfected.

Inherent Versus Mechanical Stability

HE aeroplane that will immediately be available for commercial, sporting and every-day purposes will not be the machine that most nearly follows the lines of a bird in construction, but rather the plane that is equipped with automatic devices that constantly check up the stability, meeting bumps, air pockets and other atmospheric disturbances as

ing binnys, air pockets and other atmospheric disturbances as they start, and adapting the machines to them before they have actually been felt by the pilot.

Sperry Groscope Company, speaking before the second Pan-American Congress. Mr. Titterington, of the Sperry Groscope Company, speaking before the second Pan-American Congress. Mr. Titterington told of many startling weapons of the air undep ossible through the use of automatic stabilizers, which showed the great advantage over machines not so equipped.

"In working out inherent stability," said Mr. Titterington, "attempt is made to make the plane stable hy shaping its parts and spacing them in such a manner that it will tend to fly in

and spacing lifem in such a mainer that it will tend to fly in a horizontal plane and along a straight line.
"Some inherently stable planes fly wonderfully well in still air, banking automatically on turns and maintaining their longitudinal angle in fine style, but they are invariably difficult to control in rough weather, rolling and pitching violently on encountering slight disturbances. The rolling, pitching and pitching and turning movements are so interconnected that the plane cannot roll without also turning and pitching or turn without rolling. This makes it necessary to work two or more conrolling. This makes it necessary to work two or more con-trols when an inherently stable machine encounters a gust, while with the ordinary type the operation of one control would be sufficient. Their rolling and turning movements are particularly strongly connected. In fact, they lose nearly all their inherent stability if held right on the course by the pilot operating the rudder.

operating the rudder.

"While I do not wish to be quoted as saying that there is no future for inherently stable machines. I believe it to be a fact that the disadvantages inherent in such machines are so great that their field is very limited. As machines are made larger they will naturally be steader in flight, but no planes have been yet made that will fly successfully in rough air without being controlled by the pliot or by some mechanical work of the production of the production of the planes can be produced. Man has been making believe such planes can be produced. Man has been making best from he never dawn of history, but he has not ver better such plants can be produced. Man has been making boats from the very dawn of history, but he has not yet made one that would go steadily through a rough sea, not-withstanding the fact that this is a much simpler problem than making an aeroplane fly steadily in disturbed air.

"It is certainly desirable that a plane have a small amount of stability so that it will right itself when upset and tend to remain in the correct flying position, but too great a stable tendency is most decidedly undesirable.

"We now come to the consideration of mechanical stabilizing apparatus, that is, apparatus which might be called auto-matic pilots, as they control the plane by operating the con-trol surfaces in much the same way that the human pilot would operate them. There have been innumerable inventions

and suggestions along this line. "It is not possible for even the most expert pilot to tell that his plane is encountering a disturbing force until the plane is actually tilted. By this time it has acquired some momentum, and a considerable movement of the controls is necessary to and a considerable movement of the controls is necessary to bring it back to its correct position. The advantage of the automatic pilot over manual control is that it detects the slightest tilt of the plane and has already moved the control surfaces to correct it long before a human pilot would notice that the plane was tilting. The result is that the control surthat the plane was tilting. The result is that the control sur-faces are moved only a slight amount as compared to the amount the pilot would move them, and the tilt of the plane

is only a fraction of what it would be with manual control.

"There is another use to which an automatically controlled There is another use to which an automatically controlled plane can be put that is destined to be of tremendous importance in future warfare, if the new League of Nations does not succeed in preventing wars. I refer to the aerial of War. The idea is to equip a cheaply constructed aeroplane with automatic control, load it with all the explosives it can carry and direct it toward the enemy. Special apparatus is used to dive the machine when it reaches the target. I can been made with the state of the target. The state of the control contr

Company long before our entry into the war.

"A flying boat was equipped with automatic control and other special apparatus. The boat was headed either directly other special apparatus. The boat was headed either directly at the target or to one side or the other, depending upon the direction of the wind. The automatic pilot was adjusted so as to climb the machine very slowly. The throttle was then opened and the machine released. It would get off the water automatically and climb to a predetermined altitude, where it was leveled off by an automatic altitude control. It would then fiv level until reaching the target, where it would be vol-planed automatically by a device which I am not at liberty to describe. In these tests, a pilot went along with the machine to bring it back to the starting point, but, of course, did not touch the control until after the plane had reached its desti-

count me control until after the plane had reached its desti-nation. The accuracy of fire was found to be very remark-able, in view of the uncertainty of the air currents. "There have recently been some published reports of a radio controlled torpedo which was gotten out by the French Government. This torpedo was controlled by radio from another plane several miles away, and in experimental flights was made 10 for the first controlled to the controlled to was made to fly over different towns behind the enemy's lines.

573

These torpedo planes were equipped with the Sperry automatic pilot. It is thought if the war had lasted a short while longer the aerial torpedo would have become a very formidable weapon of warfare.

In peace time there is no doubt that the automatic pilot is destined to be of inestimable value in making flight safe and profitable."

Aerial Laws and Regulations

THE Joint Committee on Aerial Laws and Regulations of Air Traffic of the Second Pan-American Aeronautic Convention presented a report to the convention urging that Congress be asked to create an Aircraft Board in the Department of Commerce to supervise aerial transportation. The report includes the text of proposed temporary regulaane report includes the text of proposed temporary regula-tions to govern aerial navigation regulations that have been indorsed by President Wilson, Secretary of War Baker, Sec-retary of the Navy Daniels, Secretary of Commerce Redfield and Dr. Charles D. Walcott, the chairman of the National Advisory Committee on Aeronautics.

The text reads:
"An emergency has raised in relation to the establishment of rules and regulations to govern aerial navigation within

the United States and its dependencies.

1-At the present time there is no authority for the establishment of rules and regulations to govern aerial navigation in the United States and its dependencies except local laws passed prior to 1914 in the States of Massachusetts and Connecticut.
"2—The War Department alone now has for sale several

thousand aircraft of various types which, if put upon the market, will be purchased largely by amateurs, and in the absence of Government rules and regulations it is highly probable that many accidents will occur and much legislation

eussue,
"3—There is also a probability of complications, especially
in matters of smuggling, arising by unlicensed, irresponsible
aircraft crossing the borders between the United States and
both Canada and Mexico.

DOIN CARRIAG AND MEXICO.

"4—At the present time the Joint Army and Navy Board of Aeronautical Cognizance has been issuing licenses to pilots as war emergency, but without assuming any responsibility as to qualifications of pilots or air worthiness of the aero-

planes. planes.
"It is held that the power of this military board ended with signing of the armistice, Federal Judge Walter Evans having handed down a decision on April 3rd to the effect that the war ended (egally when Fresident Wilson in his address helore Congress on November 11, 1918, referring to the defeat of Germany said: The war thus comes to an end."
The Arro (Lub of America has for the past ten years been

issuing certificates and contests as provided by the rules of the International Aeronautic Federation which governs all

acrial contests.

The Joint Committee urges that Congress be asked to create an Aircraft Board in the Department of Commerce, as provided in the following bill, the adoption of which is urged;

1.—Be it enacted by the Senate and House of Representa-tives of the United States of America in Congress assembled. That all persons not in the military or naval service of the United States are hereby prohibited from operating any aeroplane, balloon, or other invention or device used for navigating the air, without first obtaining a license from a board appointed by the Secretary of Commerce as hereinafter provided.

Sec. 2. That the Secretary of Commerce is authorized and directed to appoint three persons who shall be known as the Aircraft Board and who shall have power to insue licenses for the operation of machines or other devices which traverse the air for commercial or other purposes,

are for commercial or oner purpose.

Sec. 3. That the Aircraft Board shall consist of these men.

Sec. 3. That the Aircraft Board shall consist of the construction and operation of a dirigible balloon. The Secretary of Commerce shall designate one of the board as chairman, who shall receive a salary of \$4,500 a year; the other members of the board shall receive a salary of \$4,000 a year each. The Secretary of Commerce shall provide offices for said board; and such clerical assistance as may be needed shall be employed with the approval of the Secretary of Commerce.

Sec. 4. That it shall be the duty of the board to arrange for and conduct examinations of persons who apply for itemses to operate aircrait machines, balloons, or other similar devices, and a license shall not be issued to any person who, in the opinion of the board, is not qualified to operate the machine or other aircraft device covered by the license for which he has applied. The board may designate persons to conduct examinations at distant points or for the convenience of applicants for licenses. Persons so designated must have qualifications similar to those required of members of the board; compensation for the examiners so designated will be fixed with the approval of the Secretary of Commerce and in no instance shall it exceed \$2,500 annually for any examiner.

Sec. 5. That traveling and subsistence expenses shall be allowed on the same basis as that provided in existing law for officials of the Department of Commerce. The sum of \$50,-000 or as much thereof as may be necessary is hereby appropriated out of the money in the Treasury not otherwise ex-

pended to carry out the purposes of this act.

Sec. 6. That the Aircraft Board hereby created is authorized to issue temporary or probationary licenses until such time as a plan for holding examinations is provided and an opportunity given to applicants to try said examinations. When, however, a sufficient time has elapsed and ample opportunity given to hold the said examinations conducted by the Aircraft Board and for any applicant to try such examina-tions, it shall be unlawful for any person not in the military or naval service of the United States to operate an aeroplane, dirigible balloon, or other device for navigating the air, and dirigible balloon, or other device for navigating the air, and any person who operates an air device or invention in violation of the terms of this Act shall be guilty of a misdemeanor and liable to a fine of not to exceed \$100 or six months imprisonment, or both, for the first offense, and imprisonment. ment for not to exceed six months for any subsequent offense.

In anticipation of the adoption of such a measure the Aero Club of America, the Aerial League of America and the Atlantic City Aero Club have established a system of registration of aircraft and aviators at the Atlantic City Airport and are developing a system of registration and clearance papers for

aircraft and air pilots and passengers.

afternat and an inguist and passengers of the Committee The following authorities are members of the Committee The following authorities are members. Alm R. Hawley, Henry, Woodhouse, Albert T. Bell, W. W. Young, Colonel Jefferson de Mont Thompson, Thomas F. Powers, W. W. Niles, Colonel Charles Elliott Warren, Augustus Post and Major Reed C. Landis, son of Judge Landis and second ranking American Ace.

Aerial Acrobatics

Sensational acrobatics that made even Eddie Stinson, heretofore the most finished of the air pilots who have been amazing the throngs at the Atlantic City Airport, hold his breath from his "orchestra seat" a little off to one side in his own aeroplane, featured when Lt. Omer Locklear, former Army sky-skipper, momnted five times from one aeroplane to another by means of a rope ladder swinging clear in the air. Crowds below, who had been told that the lieutenant, who was the first man to jump from a plane above to the one underneath, would attempt to reverse the order, could see him standing upright on the upper wing and reaching for the lad-der as one machine maneuvred by Lt. Melvin Elliott hovered over a second piloted by Lt. Shirley Short.

But it was Eddie Stinson who brought the real story of the maneuvres to the ground. "I have seen some nice balancing and daring driving of aeroplanes but those two pilots and Lt. Locklear showed me something new today," declared Stinson, who himself was chief of aerial acrobatics in south-

western army flying fields throughout the war.

"While Lt. Locklear was swaying back and forth on top of the Short machine, Lt. Elliott swooped down from above, and so much confidence did those two drivers have in one another that the machines actually kissed one another, making it necessary for Lt. Locklear to drop and stretch out flat on top of the plane. Yet with cool daring he flipped upright again and grabbed for the ladder as they pulled away. It was the most remarkable aerial stunt. It was one of the most daring bits of game flying I have ever seen." Eddie had been up with a photographer, trailing the two planes throughout the trips,

Crowds below knew nothing of the aerial kiss but they saw the machines so close together that they looked as one skooting through the sky over a thousand feet in the air. Lt. Locklear, baffled by the wind, made three desperate trips across the field standing up on the wings of the aeroplane while the throngs below nervously clutched one another fearing that he throngs below nervously clutched one another fearing that he would be dashed to death at any instant. Just to show that he was still perfectly cool he proceeded to climb all over the plane as it swooped down within a hundred feet of the ground, once lianging by a precarious hold to the skid at the extreme tip of the right wing and again hanging by his knees from the axle of the landing gear beneath the fuscinge, permitting the wind to swing him back and forth head down like a pendulum.

The intrepid aviators demonstrated that it would be possible to change to another plane if the one you are travelling on catches fire.

Some of the Exhibitors

Among the exhibitors at the Second Pan-American Aero-

Among the exhibitors at the Second Ban-American Aero-nautic Convention at Albanic City who featured display booths in the Aeronautic Hall of the Steel Fier were: The Curtiss Flying Station, of Atlantic City, represented by Messrs. Harold Kinne, A Livingston Allen and J. M. Ked, which displayed the latest type of Curtiss two-passenger touring accipitane, beautifully finalized with nickled matria-wing and one half the finelage throughout its length for the instruction of interested visitors; a working model of the largest wind tunnel in the world; drawings, photos and models of different types of Curtiss aeroplanes, sepplanes and hop, and the Curtiss 12-400 ho, until recently known as the Kô and K12 types, respectively. The local Curtiss station wished also to exhibit the Curtiss MF flying boat—J pas-sengers' capacity and equipped with the Curtiss motion, but Interested persons were directed to the flying field, where the flying qualities of this "boat" were demonstrated to the in-terested persons. terested persons

The American Propeller and Mfg. Co., of New York City, represented by Messrs. A. B. Streeter and W. W. Christian, which displayed the Iuland Piston Rings.

The Branswick-Balke-Collender Co., of Chicago, represented by Mrs. M. Bull, which displayed different types of the all-rubbe propeller which the manufacturers believe will defeat the present effect of rain and sand on the rapidly revolving air screw and which is now undergoing tests for the United States Army and Navy. The Abercrombie and Fitch Co., of New York, represented

by Mr. A. S. McDade, which exhibited an assorted line of

aviation clothing and equipment.

Miss Mason's Castle School, of Tarrytown-on-the-Hudson, a school of instruction in aviation for women, represented by

Miss Flsie Toboldt

Miss Fiste 10boldt. The Champion Spark Plug Co., of Toledo, O., represented by Mr. George F. French, which displayed the Champion spark plug, the component parts of the plug and a set of colored views illustrating the procedure of manufacture in the company's factories.

the company's factories.

The Spiliofor Electrical Co, of Newark, N. J., represented by Mr. Daniel Walls, which exhibited Spilidorf magnetos, instruments and spark plugs and by cleerly-arranged detection of the Spiliofor of the Spiliofor of the Spiliofor of the Spiliofor exhibit that were of particular interest to visitors were a Hispano-Sniza motor equipped with Dixie V that crackled and blazed with the continuous firing of spark plugs embedded in its surface.

The Triplex Safety Glass Co, of New York, displayed Triplex wind shields and aviator's goggles. The Sperty scope Unit, Mark 1 Mod. E, the Sperty compans, speed

indicator, barograph, altimeter, etc. The Aircraft Instruments and Supplies Co., Inc., of Atlantic City, displayed various in-struments, including the Shotwell Electric Weather Vane and the Charles Lane Poor Line of Position Computers. R.A.F., who also represented the Renault Motor Works, of France, which exhibited the Renault 12 cylinder 350 h.p. motor.

The Aeronautic Library, Inc., of 299 Madison Ave., New York City, represented by Miss Josephine Dunn, displayed aeronautic text books and other books on Aeronautic subjects. The aeronantic publications, Flying, Arrival Age
Weekly, and Air Power, were represented by a pictorial dis-

other exhibits of great interest were the gallery of French Aerial War Paintings, by Lieut. Henri Farre, official painter for the French army during the war, the aerial war paintings of the American naval aviator, Lieut. Ruttan, and the trophies that were competed for during the convention.

Honor 123 Flyers Killed in Service

Posthumous honors for the 123 officers and enlisted men attached to the marine aviation force and United States naval officers of the Aviation Corps who lost their lives in the ser-vice of their country during the war were awarded by the Second Pan-American Aeronautical Congress at impressive services on the Steel Pier.

There were eighteen States represented on the list of the

There were eighteen States represented on the list of the marine force and twenty among the heroes of the tawal corps. Diplomas were drawn by the Aerial League of America and forwarded to the mothers or next of kin by the convention through Secretary Post of the Aero Club and the Aerial League of America mintee consisted of Rear Admiral Roberte E. Peary, Alan R. Hawley, Capt. Robt A. Bartlett, Capt. Grarwille A. Pollock, Rear Admiral Bradley Fiske, Major Reed Landis, Albert T. Bell, Thomas F. Powers, John Hays Hammond, Jr. Col. Lester Jones, U. S. A. M. S. Herry Woodhouse, Joseph A. Steinmetz, K. M. Turner, W. W. Niles, G. Duuglas Wardrop and A. S. Abell 3d.

The awards read: "This diploma of home cognition of the Aerial League of America is hardered to the cause of humanics."

patriotic service which he rendered to the cause of humanity and civilization in the service of the United States during the war," and bore the signature of League President Robert

E. Peary,
Among the prominent birdmen attached to the Marine Aviation force honored were: Major D. B. Roben, Big Rapids,
Montchir, N. J., Lect. Thomas J. Butler, New Rochelle,
N. Y.; Lieut. Endward Cain, Catonsville, Md.; Lieut. Duncan
H. Cameron, Englewood Pa.; Leut. Donald R. Cowles, Carrington, Conn.; Lieut. Marcus A. Jordan, Washington, D. C.;
Sullwan, Richmond, Va.; Lieut. William R. J., Bulian, Berry,
La.; Sergt. Emil Rosenfield, Miami, Fla.; Sergt. William P.
Cammon, Cleveland, O.; Sergt. Clemvny Norhauer, Sigonney, Iowa; Corp. David F. Price, Boscobel, Wis.; Corp. Wal(Continued on 1992 597)



The Curtiss Model H-A Hydro, the Fastest Seaplane in the World



THE NEWS OF THE WEEK



Stefansson and Wright Discuss North Pole Flight

Dayton, Ohio, May 22.—For the pur-pose of discussing with Orville Wright pose of discussing with Orville Wright the possibility of using the aeroplane for North Pole trips, Vilhjalmur Stefansson, international explorer, paid a visit to Wright at the latter's home here on May

Stefansson declared he believed it possible to construct a special type of aeroplane that would carry a party of ex-plorers to the field of study at the north pole. He plans, if satisfactory arrangements can be made, to attempt such a trip during this year or the first of the coming vear

Col. Hall Given D. S. M.

Washington, D. C.-Award of the Dis-tinguished Service Medal to Elbert J. Hall, formerly a lieutenant colonel in the Signal Corps, for his work in designing the Liberty motor, was announced re-cently by the War Department.

Two Aerial Forest Patrol Routes Start June 1

Washington, D. C.-Two routes in the patrol of National Forests by Army aeroplanes, to give early warnings of fires in the forests, have been arranged by the War Department and the Forest Service, United States Department of Agriculture. The routes will be operated from Mather Field, near Sacramento, and will be placed in operation June 1, on the same day as two routes to be operated from March Field near Riverside, Cal.

The first route from Mather Field will cover the northern Eldorado and Tahoe cover the northern Eddorado and Lanoe Forests on the valley side of the Sierras. It will start from Mather Field and proceed to Placerville, Coffax, Nevada City, Strawherry Valley, and Oroville, where the planes will land at a field now available. This route will be covered in the morning of each day, and return trips will be made in the afternoons.

The second route from Mather Field will cover the southern Eldorado and Stanislaus Forests. Starting from Mather Field the route goes to Placerville, Grizzly Flat, Big Trees, and to a landing near Sonora or Tuelumne, This route will be covered in the morning and return trips will be made in the afternoons. Both of the Mather Field routes have a round-trip length of about 150 miles.

Forest Service reports tell of a successful trial patrol undertaken recently. No difficulty was experienced in detecting fires in heavy timber at elevations of 6,000 to 10,000 feet.

Washington to New York in a Hundred Minutes

Mineola, N. Y.—Captain Leroy Charles and Lieut John Roullet made a flight on May 17 in a DeHaviland 4 from Wash-ington in an honr and forty minutes.

Victory Loan Fliers Covered 19,000 Miles

The three "companies" of the "Victory Loan Flying Circus" ended 30-day tours at their home stations, after "playing" in 88 cities, in 45 States, and covering in "one-day stands" circuits totaling 19,124 miles.

Navy Plans Larger Aeronautic Program

Washington, D. C.-The Navy Department is so enthusiastic over the results of the first attempt at a transatlantic flight that broad plans are being prepared

for expansion of the aerial program. In brief, these points are: 1. General development of aircraft necessary for the fleets, including the enlargeseaplanes and ment of observation

balloons 2. Extensive experimentation in the laboratory and by flying tests for obtain-ing improved planes of both heavier than

air and lighter than air types, for service in home waters and overseas. 3. Development of the rigid, lighter than air machines (the Zeppelin type), as well as the dirigibles of the C-5 type.

4. Perfection of the coastal aerial patrol service.

A prominent naval official said recently that one of the most important conclusions reached as a result of the flight to the Azores was the practicability of the multi-Azores was the practicality of the multi-engine scaplane. The results which had been attained, he said, made it evident that the development of larger and more durable planes which would be almost as seaworthy as a vessel of considerable pro-portions was feasible and that in the opinion of the navy experts there was no reason why such a seaplane could not be made of sufficient strength to carry at

least as many as eight engines.

The advisability of constructing huge lighter than air craft has resulted in recommendation of a large appropriation, said to be \$10,000,000, for experimental work on large types of dirigibles.

Curtiss Plane Flies 500 Miles at 2 Miles Per Minute

Portland, Me., May 20.—Major M. H. Gilksen, U. S. A., flying a Curtiss ad-vanced training plane, arrived here on May 20 after a non-stop flight from Mineola, L. I. He made the distance, about 500 miles, in four hours and ten minutes. He was scheduled to stop in Boston, but was going so well that he continued to

was going so the Portland.

Major Gilksen is accompanied by H. M. McGraw, electrician. Weather conditions were good and the flight was un-

Secretary Crowell Sails on Aeronautic Mission

Assistant Secretary of War Benedict Crowell sailed on May 22 on the transport Mount Vernon with a delegation which will study aviation abroad for three weeks or longer. With the Assistant Secretary were his aid, Colonel James A. Blair, U. S. A.; Captain Henry C. Munson, U. S. N.; Howard E. Coffin, of the counil on National Defense, S. S. Bradley, of the Manufacturers' Aircraft Association, George H. Houston, President of the Wright-Martin Aircraft Company, and Charles M. Keyes, Vice President of the Curtiss Aeroplane and Motor Corpo-

This mission is going ahroad for the purpose of learning what treat Britain, France and Italy have done since the armistice was signed to develop a peaceme program for civilian avaiton.

On arriving in France they will report to President Wilson and expert advisers designed to the program of the purpose o

will be assigned to the mission. Admiral Knapp, U. S. N., an admiralty expert, and Colonel William Diniwoody, chief of the air service supplies of the American Expeditionary Forces, will be among those called to advise the mission.

New Films of Air in Motion Abuot Aerofoils Will Aid in Design

Washington, D. C., May 22 .- A series Washington, D. C., May 22.—A series of films of remarkable value to aircraft engineering were taken under the supervision of Colonel Rutherford B. Harts at Bolling Field under the auspices of the Division of Military Aeronautics and the Inventions Section of the General Staff showing the movement of air in motion. So important is this discovery considered



The Curties LR1 triplane with a Curties OX engine

that an effort was made to deliver them

that an effort was made to deliver them to Secretary Crowell aboard the transport Mr. Vernon by aeroplane. Three miles of film were used in making these photographs of air in motion across aerofolis, or wings, of aeroplanes. They prove that the element of rarefaction, which produces the lifting power of an aeroplane, is not continuous, but is exerted in the control of the contro in intermittent or pulsating arr waves.

These power waves have a period of generation, development, climax of lifting power, and speedy collapse, with a resultant aerial undertow. The photographs show plainly that for over 30 per cent. of the time of flight no flying power what-ever is exerted on the wings of an aircraft

by the air flow produced by the air screws The camera is the invention of Fairfax Naulty, of New York.

War Planes Making Fast Cross Country Flights

Washington, D. C .- In connection with the War Department's recruiting cam-paign, several speedy cross-country flights have been made.

Col. G. C. Braut and Lt. H. Birkett en route Houston, Tex., to New York, flew from Houston to Belleville, Ill., in a De Haviland 4, distance 720 miles, in 453 min-

riaviand 4, distance 220 miles, in 455 min-utes on 17th.

Lt. Solomon F. Baker flew from Mt. Clemens, Mich., to Jackson, Mich., 94 miles, in 105 minutes.

Using a Curtiss JN411, Lt. Geo. H. Mc-Kay completed a flight from Belleville, 111, to York, Nebraska, a distance of 500 miles, in 345 minutes.

Bad weather held the flyers at Belle-Bad weather held the flyers at Belleville until May 20, when they flew to Dayton, O., a distance of 310 miles, in 210 minutes. They left Dayton May 22 and flew to Washington, Pa., 240 miles, in 120 minutes. The last leg of the journey was made from Washington, Pa., to Washington, D. C., 235 miles, in 127 min-

The 1,505 miles between Houston and Washington have been covered in 910 minutes

Queens Borough Offers Government Landing Fields

The Queens Borough Chamber of Com-merce (New York City) has offered to

the Government the services of its manufacturing and industrial committee, Ray Tacturing and industrial committee, Ray Palmer, chairman, in securing necessary landing fields for both aeroplanes and seaplanes. The attention of both the Sec-retary of War and the Secretary of the Navy has been called to the advantage of Queens for the location of landing fields. There are many large, level undeveloped areas about both Flushing and Jamaica bays. There are facilities—trolleys, railroad and elevated lines-for rapid transit to Mauhattan, if for any inex-plicable reason an aviator landing in Queens should desire to cross the bridge.

Marconi Wins Exclusive Right to Fleming Valve

A decree signed by Federal Judge Mayer on May 21 gives to the Marconi Wire-less Telegraph Company of America the less leigraph Company of America Ite exclusive ownership of a patent granted Nov. 7, 1905, to John Ambrose Fleming. The decree excludes the Atlantic Communication Company from all rights in the invention. The court appointed ExJudge E. Henry Lacombe a special master to ascertain the amount of damages to be assessed aginst the defendant company. This device, in improved form, is used for radio telephone communication.

Bureau of Standards Develops Spark Plug Porcelain

Considerable trouble has been caused in aeroplane engine work through the breaking of the central electrode of sparkplugs. An investigation of this problem was undertaken by the Bureau of Stand-ards at the request of the Bureau of Air-craft Production. The results are given in Aeronautic Power Plants Report No. 35, which shows that in many cases the cement used to hold the nickel electrode wire in the porcelain is of such a nature that it rapidly eats away the wire through temperature of the engine cylinder. A cement composed of silicate of soda and raw kaolin has been found to give the least trouble in this respect.

In cases where the cement holds the wire firmly in the porcelain the latter often cracks when subjected to heat due to the difference in the coefficients of

thermal expansion of the wire and the porcelain. The breaking of the porcelain does not seem to be due to leaky spark-plugs, as has often been supposed to be the case.

On account of the difficulties attending the use of any form of cement between the porcelain and the central electrode, of a mechanical seal at the top of the por-celain is greatly to be desired. In such a plug only a porcelain strong enough to withstand the resulting stresses safely should be used. The porcelain recently developed by the Bureau of Standards is believed to meet these requirements.

Civilian Flying Licenses Issued by the Joint Army and Navy Board of Aeronautic Cognizance

Washington, D. C .-- The following civilian licenses have recently been issued: 14

Issued to Address Issued to Address
Service Aviation Training & Transportation
Company, Wabash, Ind.
Tony, Barone, Fort Worth, Tex.
It. W. Hanelette, Wort Worth, Tex.
Clarence F. Calo, Beaumont, Tex.
Francis B. Towle, Larchmont, N. Y. 343 464 Donald Gifford Vande Water, Washington,

Howard J. Ludington, Holley, N. Y. G. W. Shaw, Caribou, Me. Laurence L. Russell, Wilmington, Del. Adolphus R. McConnell, Knoxville, Tenn. Kenneth Campbell, Strawberry Pt., 469

F. E. Carter, Chevy Chase, Md. Goodyear Tire & Rubber Company, Akron, Obso 471

Goodyna Tire & Rubber Company, Atron.
Henry C, Kenly, Washington, D, C,
William, L, Kenly, Washington, D, Lo,
J, Tillia, Jr, Deland, Fla.
L, J, Tillia, Jr, Deland, Fla.
Lopan T, McMereny, Recklord, Ill.
Lopan T, McMereny, Recklord, Ill.
Lopan T, McMereny, Recklord, Ill.
Loyand P, Merenny, Statistics, Loyand L,
Loyand P, McMereny, Recklord, Ill.
Lymna B, Lecknowd, New York (n)
Lymna B, Lecknowd, New York (n)
Lymna B, Lecknowd, New York (n)
Mark F, Ashley, Nerwood, N. Y.
Walker B, Hawkins, 311 West Maple St.
Walker B, Hawkins, 311 West Maple St.
Walker B, Hawkins, 311 West Maple St.
George W, Putturan, Des 202, Millershurg,

George W. Putman, Box 402, Millensburg, George V. Grey, 780 Kinston Ave., Pred-mont, Cal.

Lyman A. Wine, 164 Winona Ave., Detroit, Mich. Clarence W. Osburn, 151 W. Pike St., Clarksburg, W. Va.

400 George C. Beck, Salt Lake City, Utah. 502 Paul F. Baer, 11 East 38th St., New York City, N. Y.

City, N. Y.
Paul Micelli, 463 West 150th St., New York
City, N. Y.
Wilber P. Larrahse, 119 Groveland Ave.,
Minneapolis, Minn.
Henry Illago Hewetton, 493 Ave. E., Bayonne, N. J.
Paul Augustine Bogan, 44 Guild St., Boston, 505

506

506 Paul Augustine Bogan, 44 tunto St., Bosnon, Mass.
507 Caspar D. Swinson, 80 Alfred St., Detroit.
508 Dean L. Lamb, 11 East 38th St., New York City, N. Y.
509 W. M. Brainerd, 533 West 31st St., Okla-hom City, (kla., Grouge Pothes, 2424 Indian Ave., Chicago, Group Pothes, 2424 Indian Ave., Chicago, St., Chiland, Conference Pothes, 2424 Indian Ave., Chicago, Group Pothes, 2424 Indian Ave., Chicago, Chic

William S. Breck, eare B. W. Beam, Celina,
 Xi William S. Breck, are B. W. Beam, Celina,
 Xi S. W. Walling, 1241 Philip St., New Orleans, Poyrer, 733 Merchanta Road,
 Glen Wen, Poyrer, 733 Merchanta Road,
 Challes, P. W. Welling, 216 Barrett Place,
 Challes, A. Willerg, 535 Charles River Road,
 Cambridge, Mass.

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Curtiss R-4 mail plane equipped with 12 cylinder Liberty motor

Dirigible Lands its Passengers on Cleveland Hotel Roof

Cleveland, May 23 .- For the first time on record a vehicle of the air was brought to a convenient stop in the heart of large city when a dirigible balloon landed large city when a diriginic balloon same on top of a prominent hotel here this evening to permit two of its five passengers to alight. The 100-foot dirigible, the A-4 which has a gas capacity of 95,000 cubic feet, after seven attempts landed on a specially constructed platform 30 by 30 feet.

The balloon was piloted by James Shade from the Wingfoot Lake Naval Air Station near Akron. Ralph H. Upson, winner of the last international balloon eat Paris in 1913, and Major C. H. Maranville, flying instructor at the training station, were among the passengers.

Raw Materials for Aeroplanes

Some idea of the quantity of wood necessary for aeroplane and propeller con-struction may be obtained from the fol-lowing table of actual deliveries, as pub-

lished in a British journal;	., ,
Spruce,	
Board feet.	Totals.
U. S. Army 25,472,000	2010-01
U. S. Navy 8,667,000	
England 36,877,000	
Italy 9,147,000	
	103,092,000
Douglas Fir.	
U. S. Army 19,193,000	
U. S. Navy 21,746,000	
England	
France 9,460,000	
	71.625.000
Port Orford Cedar,	
U. S. Army 30,000	
U. S. Navy 1,926,000	
England 2,57,000	
Engiand 2,77,000	4,513,000
Mahogany, Central America	7,310,000
U. S. Army and Navy., 4,524,000	BIS.
Allies 4,197,815	
	8,72t,815
Mahogany, African.	
U. S. Army and Navy 269,000	
Allies 200,935	
	469,935
American Black Walnut.	
U. S. Army and Navy 2,408,000	
Allies 2,096,000	
names introduction of control	4,504,876
Quartered White Oak.	. for . for .
U. S. Army and Navy 308,000	308,000
Cherry.	0001000
U. S. Army and Navy 6t8,000	618,000
C, S. Army and Navy Sta,000	010,000
U. S. Army and Navy 87,000	
Allies 33,565	
	120,565
Birch 661 000	

In addition to wood, it was found necessary to maintain strict supervision over the production of aeroplane and halloon fabrics. Of this class of material there been produced to November 11, 1918, 3.187,000 yd. of linen; 7,000,000 yd. of cotton aeroplane fabric; 2.647,000 yd. of balloon fabric.

Book Review

How An Aeroplane 1s Built; compiled by Stepney Blakeney. This is a valuable publication for the mechanic. The author—a practical me-chanic—knows and explains the best workshop methods, and comprehensively describes in this volume every item down

describes in this volume every item down to the last rive. The third the property of the third that the third t

This publication can be purchased at The Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price \$1.35 post paid.



The party of explorers, aeronouls and mechanics who are mapping the route from Australia to England

ENGLAND TO AUSTRALIA AIR ROUTE BEING SURVEYED

N aerial mail service between Eng-AN aerial mail service between Eng-land and Australia is to be estab-as the "Aerial Services, Ldc," which has been recently formed in New South Wales. One of the first steps of the com-pany is to make a rough survey of the route to be followed, and this is to be done overland with Indian motorcycles done overland with Indian motorcycles and side cars. The expedition has already set out from Sydney, Australia, and the route to be followed is: Through New South Wales, portions of Queensland, across the Northern Territory, thence to Singapore, via Timor, through Java and Borneo, through the Malay Peninsula, across India and Persia to the Mediterreases. Sea sud these six to the Mediterreases Sea sud the Sea six to the Mediterrease Sea sud the Sea six to t ranean Sea and thence to London. Landing places approximately 300 miles apart will be selected.

The party consists of Reginald Lloyd, leader; H. B. Manderson, secretary, a well known Melbourne journalist; J. Waldron, surveyor, who has been for seven years doing survey and exploration work for the Commonwealth Government in tor the Commonwealth Government in the Northern Territory, and is also under-taking the photographing and scientific work of the party; J. C. Marduel, a well known French aviator, who has seen ac-tive service in Egypt and Gallipoli, both with E-moch and Australian armies, and with French and Australian armies, and

was also instructor at the Aviation School, Point Cook, Victoria; W. J. Ousley, a motorcycle mechanic, and Kenneth Hun-ter, the second son of Mr. Percy Hunter, who is general assistant.

The party started on its mapping journey on January 31, making its night stop at Narrabri.

The route proposed to be followed from Narrabri is through Mungundi, Charle-ville, Longreach, Cloncurry and Bourketown. It is then understood that the party will proceed across the Northern Territory and to Singapore, via Timor, Java and Borneo.

In anticipation of the serious difficulties of travel by land a special outfit of fire-arms has been selected for each man to forestall trouble with the natives, and all kinds of medicines and emergency surgical apparatus forms part of the equip-ment. Motion pictures will be taken and many interesting pictures will no doubt be obtained in traversing those parts of the route which have never before been covered by explorers.

As soon as the route is mapped it is intended to cover the journey by aeroplane. Less difficulty is anticipated by this means of travel than by the trailblazing motorcycle trip now under way,



One of the power nacelles of the British Dirigible R-34, in which is installed a 12-cylindar 275 HP "Marel 4" direct drive Sunheam Catalen sixcest engine

583

Eigher twelve 4 x 5 graflex plates or Eastman cut film may be used on this camera.

The B-1 model is very similar to the A-1. The chief difference in construction lies in the mechanism for rapidly changing ence in construction lies in the mechanism for rapinly changing the exposed film, resetting the focal plane shutter, and the advantage of daylight loading with cartridge film. The operation of this model is very simple and exceptionally rapid. The camera is sighted, and a slight pressure upon the



The hand-operated C-2 Mapping Camera

thumb lever release opens the safety shutter, exposing the lens, and makes the exposure. One short, quick turn of a lever advances the film and resets the shutter. This operation can be repeated until 12 exposures have been made. The film is then rewound on the original spool, removed and replaced.

The camera weighs ten pounds. The Model C-2 camera is designed for photographic map-ping, to be mounted on a suitable vibration absorbing device, over an aperture in the floor of the plane.

Two metal magazines having phosphor bronze dark slides are provided. These magazines have a capacity for 24 plates in metal septums. The planes in the upper magazine are fed by gravity to the recording plane. The exposure is made by a slight pull of the forefinger upon the shutter release lever. A quick quarter turn of the rotary lever feeds the exposed plate quick quarter turn of the rotary lever feeds the exposed plate into the lower receiving magazine, dose the recording aperture and resets the focal plane shutter. The rotary feed received magazine and the received magazine and directly over the shutter release lever, ready for the next exposure. The same type of lens and shutter is supplied with this camera as with the A-I, except that its focal length is 8½ inches. The total weight of the camera, loaded with two magazines, is 21 pounds.

A highly perfected automatic mapping camera, known as type K-I, is best suited to extensive mapping operations. It is entirely automatic in its action. The only operation reis entirety amomatic in its action. Inc only operation (required is starting the camera. One or more exposures, within the limitation of the roll of film, may be made at will by means of a lever controlling the wind motor driving mechanism. The roll film used is 9½ inches wide and 75 feet long, sufficient for 100 exposures. The film is held accurately in the recording plane by constant vacuum suction produced by the Venturir ulue, which forms part of the motor mechanism, thereby overcoming all vibration.

The wind motor operating the camera is mounted outside the fuselage, and is connected with the camera by means of a flexible shaft passed through the side of the plane. Control for regulating the time between exposures in correct ratio to the speed and altitude of the plane is conveniently located inside the plane. After each exposure a safety curtain is auto-matically drawn across the recording plane, thus protecting the film while the shutter is being reset and unexposed film advanced into position.

The shutter permits a variation in exposures from 1/90 to The snutter permits a variation in exposures from 1/90 to 1/300 of a second. The lens has a focal length of 20 inches and an aperture 1.6. The total weight of the camera loaded, with 100 exposure film complete, is 44 pounds. Although the Eastman Company has not released these cameras for the general public, because they are still on pro-

duction on Government orders, it is probable that the types described will soon be made available for private use.

Circulation and Piling in the Dry Kiln

A GOOD dry kiln when empty may be a poor dry kiln when loaded with lumber, simply because the wrong method of piling is used. Circulation of air is necessary to distribute the heat and humidity uniformly to all parts of the kiln and to all parts of the lumber pile. Iu a kiln of good design the circulation is carefully provided for, but obstructions caused by improper piling may defeat the designer's

There are few more effective ways of baffling circulation than by piling into the kiln a quantity of lumber across the path which it was intended the air should follow. If this is done, the circulation becomes sluggish and uneven, permitting the formation of cool pockets in which lumber does not dry and hot pockets in which lumber is ruined.

Air moves differently in different types of kilns, therefore, the proper method of pilling the lumber will vary with the kind of kiln used. To run lumber into the dry kiln endwise, or crosswise, or edgewise, without regard to whether the stickers are to be perpendicular or parallel to the direction of circulation is a blind effort and not at all conducive to efficiency or satisfaction.

This point was brought very forcibly to the attention of This point was brought very forcibly to the attention of the Forcet Products Laloratory some years ago, when a prob-good design was presented by a large commercial concern. Although the new kiln was far superior to the old one when empty of lumber, in points of design and control apparatus, The trouble was that the same system of pring was used in both cases, although the direction of circulation had been changed in the new kiln. The system of circulation in the new

kiln was much preferable to that in the old, but the old method of piling, which was intended only for the old kiln, threw the

of piling, which was intended only for the old kiln, threw the lalance the other way.

It can be used to be us

ample, the reasings were as to the second of the pile of the pile. The center of the pile of the pile

The difference in temperature between the center and bottom of the pixel file of the difference was only 10 degree.

Naturally and was only 10 degree was only 10



The K-I Automatic Camera merely requires setting, the mechanism does the resi

THE SUNBEAM AERO ENGINE

N our last issue we illustrated the "Arab," "Cossack" and "Manitou" Sunbeam aero engines, and this week we take pleasure in presenting some general characteristics of these power plants.

8 cylinders.

90° Vee. Three valves per cylinder.

120 mm, bore.

130 mm, stroke, 12,260 cubic centimetres volume.

Articulating connecting rod system

Normal revolutions, 2,000 per minute.

Approximate weight per horse-power, 25 lb. Maximum horse-power obtained at 2,000 crankshaft revolu-

tions per minute, 235. Average petrol consumption, 054 pint per horse-power per

hour Claudel Hobson carburetor, type H.C.7, set in centre of Vee

formed by cylinder blocks. Variable ignition by two 8-cylinder magnetos.

Lubricant consumption, average 65 pints per hour of castor

Lunricant consumption, average o 5 pints per nour of cashor oil. Normal oil pressure to main engine details at full power, 45 lb. per square inch. This engine has also been made with direct drive instead of with reduction gear. A number of these engines have been inted with hand starters.

"MANITOU"

12 cylinders. 60° Vee.

Reduction gear teeth ratio, 28 to 44. Four valves per cylinder.

110 mm. bore.

135 mm, stroke master road side. 142 mm, stroke link rod side. 15.794 cubic centimetres volume.

Articulating connecting rod system.

314 brake horse-power.

Nominal revolutions, 2,000 per minute. Approximate weight per horse-power, 25 lb.

Average petrol consumption, 0.54 pints per horse-power per hour

Claudel Hobson carburetor, type H.C.7, set in centre of Vee

formed by cylinder blocks. Variable ignition by two 12-cylinder magnetos.

Lubricant consumption, average 8 pints per hour of easter oil. Normal oil pressure to main engine details at full

power, 40 lb. per square inch.

This engine is designed to take an electric starting motor, as well as being fitted with a hand starter.

"MAORI IV The "Maori" IV Sunbeam-Coatalen water-cooled aircraft

engine has been specially designed for airship work. It has: 12 cylinders.

Four valves per cylinder.

100 mm, bore.

135 mm. stroke.

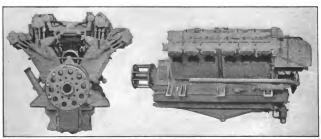
12,720 cubic centimetres volume. Articulating connecting rod system.

275 brake horse-power.

Normal revolutions per minute, 2,000. Approximate weight, 3-3 per horse-power. Average petrol consumption, 0-54 pint per horse-power per hour

Claudel Hobson carburetors, type B.Z.38, set outside. Variable ignition by two I2-cylinder magnetos. Lubricant consumption, average 65 pints per hour castor oil. Normal oil pressure to main engine details at full power,

45 lb, per square inch.
Fitted with hand starter and electric motor.
The following special fittings are included:—Water-cooled exhaust pipe, automatic governor to prevent over-running, fly-wheel in place of reduction gear, and extra large water pump to ensure efficient circulation.



Book Review

A TEXT-BOOK OF AERONAUTICS.

By Herman Shaw, B.Sc., A.R.C.S.,
A.F.Ac.S.

well-arranged text-book on nautics, which sets forth in clear and concise language all that the student needs cise language all that the student needs to know in the preliminary stages of his work, and leads him in an interesting manner into more advanced studies, giving him sufficient details to master the difficult problems which present themselves in practice. A thorough study of the book will enable the student to excel in his profession, and will reduce the house that the minimum in the opinion of the product to a proper sufficient problems. harards to a minimum, in the opinion of professional experts.

The author has in this volume recast The author has in this volume recast his lectures to officers of the English R.N.A.S., and R.A.F., given during the period of the war, with additions and many illustrations calculated to add to its value as a text-book of aeronautics. As an instructor of that English air force which reached the highest pitch of ex-cellence during the war, the author has proved the value and efficiency of his methods.

The chapter headings given below will give an outline of the scope of the book, The illustrations are clear and easy of comprehension, and accompany and elucidate the text throughout.

Chapters: I, Some Mechanical Consid-

erations; II, Air Flow; III, Wing Characteristics; IV. Streamline Flow; V. Dynamics of the Aeroplane; VI, Egui-librium of the Aeroplane; VI, Egui-librium of the Aeroplane; VII, Stability; X. Construction; X. Aere Engine; X. Mil. Instruments and Their Use; XIV. Types of Machines; XV, Design of an Aeroplane; XVI, Rigging, Testing and Maintenance of an Aeroplane; XVI, Edwin of Aeroplane; XVI, Ballooms and Airphips; XVIII, Aerial Navigation; XXII, Vireleas Fleegraphy; Index. XXII, Vireleas Fleegraphy; Index. This book may be purchased from the

This book may be purchased from the Aeronautic Library, 299 Madison Avenue. New York, at a price of \$3.75 post paid.

THOMAS-MORSE TYPE S-5 SEAPLANE

THE Navy Department has been using a number of the S-5 Seaplanes for training purposes at the Navy Air Station, Miami, Florida. This plane is really an S-4 Scout fitted with twin floats. It is the only kind of this type used by the Navy.

The power plant consists of a 100 H.P. Monosoupape Gnome engine.



General Dimensions
Length
Spread
Height 9' 7"
Weights
(poweds)
Total weight loaded
Loading per sq.ft, of lifting surface 6.25
Weight of machine loaded per h.p 14.3
Pawer Plant
Type of engine Gnome (air cooled rotary)100 H.P.
Engine R.P.M1250
Fuel capacity 30 gallons
Fuel duration at full power
Oil capacity
Oil duration at full power
Propeller type
Propeller diameter8' 0"
Propeller R.P.M
Chasels
Type
Areas
(square feet)
Area lifting surface (including ailerons)
Ailerons (two)
Elevators
Rudder 8.5
Horizontal stabilizer 16.8
Vertical stabilizer 3.5
Performance
High speed95 M.P.H.
Low speed
Climb in first ten minutes5200'

THE THOMAS-MORSE S-4 E SINGLE SEATER

The S-4 E is a modification of the S-4 C Type, brought out to meet the requirements of hose desiring a faster Besides reducing the wing area, the weight has been reduced by approximately two hundred pounds. Tapering wings have been fitted with both main wing beams well forward, leaving a slightly flexible feather edge. Remarkable amnouvering qualities are inherent with this design:

the slightest effort is required by the pilot in performing all acrobatics. General Dimensions

Height		٠.																									 							7	,	
														W	1	ni s	rb	st																		
Total v	we	ie	h	t	le	2	ıd	e	đ.								٦.													. 1	C)	13	50	- 1	lbs	ı.
Area lit	fti	nı	z	st	11	f:	ac	e	(ic	ıc	lt	tċ	lii	2)	g	a	il	ėı	o	n	s	١.				 		 	. !	4	5	5	q.	. fi	t.
Loadin;	g	pe	r		p		f	١.	o	f	1	if	ti	in	g	5	st	11	f	ac	e								 				.8	Ü	lb:	٤.
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Weight	0	f	#	na	c	hi	n	e	k	oa	d										1	p	01	V	et	۲.		 						. 1	2	ð
																r																				

Area lifting surface (including ailerons)	145 sq. ft.
Loading per sq. ft. of lifting surface	8 lbs.
Required horse power	90
Weight of machine loaded per horse power	12.8
Power Plant	
Type of engineLe Rhone (air cooled rotary)	80 H. P.

Engine R. P. M													
Fuel capacity													
Fuel duration at full power													
Oil capacity4 gal.													
Oil duration at full power													
Propeller type													
Propeller diameter													
Propeller R.P.M. 1.250													
Chassis													
Type"vee"													
Wheels													
Tires 26" × 3"													
Areas of Control Surfaces (Square Feet)													
Ailerons													
Elevators													
Rudder 7.3													
Horizontal stabilizer11.2													
Vertical stabilizer													
Performance													
High speed													
Low speed 55 m.p.h.													
Climb in first 10 minutes													
Cambo in most to manutes													



The Thomas-Morse 5-4 E Single Seater Advanced Training Scout, which makes a speed of 112 m.p.h. with an 80 H.P. Le Rhone engine



Creator of Improved Aircraft



QUICK DELIVERIES CAN BE MADE ON ANY OF THE FOLLOWING NEW TYPES

LAWSON TWO ENGINE 20 PASSENGER CARRIER LAWSON THREE ENGINE 32 PASSENGER CARRIER LAWSON TWO ENGINE MAIL CAR—CARRIES 3000 Lb. MAIL LAWSON THREE ENGINE MAIL CAR—CARRIES 4000 Lb. MAIL LAWSON STEEL BATTLER—CARRIES 8 MACHINE GUNS

All Lawson aircraft, whether commercial, military or sporting types, are planned, designed and built under the direction of Alfred W. Lawson, the well-known aeronautical expert, who has had 12 years of all round practical experience in aircraft work.

Lawson Air Line Transportation Company

MILWAUKEE, WIS.

BUILDER OF BIG AIRCRAFT

Was First to Advocate Them

ALFRED W. LAWSON, PRESIDENT OF THE LAWSON AIRLINE COMPANY, PLANNED BIG SHIPS OF THE AIR MANY YEARS AGO

TOW that the large aircraft has been so successfully demonstrated it is interesting to note that Alfred W. Lawson, President of the Lawson Air Line Company, was one of the first of the Aircraft manufacturers of the world to advocate their construction and utility.

As far back as 1908, Mr. Lawson as editor of the Magazine
"Fly," which he established, frequently called the attention of his readers to the Big Passenger carrying ships of the air that

his readers to the Big Passenger carrying ships of the air that would corntally come, and subsequently, during the years 1910-billy the property of the prope

an advanced step.

In 1913 Alfred W. Lawson entered into an agreement with Johann Schuette of the Schuette-Lanz Airship Company of Germany, to establish a passenger carrying air line between New York and Washington. Arrangements were under way for this project when Mr. Schuette notified Mr. Lawson that the Kaiser had forbidden the plans of the Schuette-Lanz Airship going out of Germany

Mr. Lawson has spent all of his time during the last twelve rears in helping to build up the Aircraft industry in America and he has thus gained practical experience from every angle.

The big passenger and mail carrying ships that are now being built under Mr. Lawson's direction in Milwaukee, Wisconsin, are therefore but the outcome of plans he had thought out years ago and which he strived to interest capital to build, then, without

During the past three years Mr. Lawson was General Manager of the Lawson Aircraft Corporation, who were principally occupied in building military airplanes. Many new and original types of military machines were designed and built under Mr. Lawson's direction during the war.

The M.T. 1 for primary training; the M.T. 2 for advanced training, the M.T. 3 for Reconnaissance work and an all steel machine—the Lawson Battler—for trench, infantry and cavalry fighting were right up to the minute in their performances. (The Steel Battler was not finished at the time hostilities ceased.)

One thing in particular that Mr. Lawson takes great pride in, and that is that there has never been a man hurt in a Lawson airplane. He is a stickler for safety even at the expense of performance. However, he has up to date invariably gotten the performance as well as the extra safety put into his machines.

More than a year ago, when it was found impossible for steam ships to transport all of the airplanes across the Atlantic that America was preparing to build, Alfred W. Lawson invented the "Trans-Oceanic Float System," whereby a thousand airplanes a day could be sent streaming across the ocean under their own

nower. power.

According to this system a number of steamships devoid of their superstructure and known as "Floats" were to be stationed at superstructure and known as "Floats" were to be stationed at posts and signal and landing stations for all types of sirpinare, from whence fuel and aid could be obtained and repairs made when necessary. Land sirplanes were to alight upon the decks of these steamships or floats, while flying boats or hydro-airplanes were to alight upon the water shopside of them.

The plans of this system were given to both the United States Navy and Army officials by Mr. Lawson in June, 1918, and shortly afterward the same plans were given to the British Navy. Mr. Lawson's system made crossing the Atlantic Ocean by air-

plane a very simple process, a practical everyday feat that could be accomplished by any number of ordinary aviators on any sort of airplanes,

of arpsanes.

The transalantic flight by a Navy flying boat recently was made according to the principles of Mr. Lawson's Floating System.

The Navy stationed steamships across the ocean at intervals of fifty miles apart, as indicated in Mr. Lawson's plans, to act as guide posts, signal stations and for fuel and repair ships in case

Events proved conclusively that without these floating stations the Navy flight could not have been made.

The failures of F. P. Raynham and Harry G. Hawker in their

attempts to make non-stop flights across the Atlantic prove the futility or at least the uselessness of that system for some time to come

Recently published photographs show that the British Navy have already successfully tried out and adopted steamship floats for land airplanes to alight upon at sea,

for and arpianes to augot upon at sea.

Had the Brittish Navy stretched these steamship floats across the Atlantic at intervals of fifty miles as the United States Navy did with their warships, then Harry Hawker, F. P. Raynham or any other aviator could have flown across the ocean with ease and certainty, and it would not have been necessary to leave their wheels behind or break down from overloading with fuel

The British Navy would then have proved Mr. Lawson's system for land machines as the United States Navy proved it for flying



THE LAWSON M.T 2, ONE OF THE DIFFERENT TYPES OF MILITARY AIRPLANES DESIGNED AND BUILT BY THE LAWSON AIRCRAFT CORPORATION DURING THE WAR



The AIRCRAFT TRADE REVIEW



Government Orders Loening Monoplanes

The first Government peace time order for aeroplanes has been placed by the U. S. Navy Department with the Loening Aeronautical Engineering Corporation, Aeronautical Engineering Corporation, New York City, for the immediate deliv-ery of six special Loening Monoplanes which are to be used in the Navy De-partment for shipboard observation use.

Recent experiments started just prior to the close of the war, and continued for several months thereafter, have disclosed several months thereafter, have disclosed the remarkable efficiency with which fast high powered aeroplanes can be used by the Navy Department for observation and spotting of gun fire of the battle-ships. The Loening Monoplane, a new type of two-seater fighter, which was designed by Grover C. Loening, formerly chief aero-nautical engineer of the Army Air Service, was accepted by the Government just prior to the armistice, and after official tests forming two-seater fighter in the world. Several records for speed and altitude have been broken in the official trials by Major R. W. Schroeder of the Army Air

Service.

The machines for the U. S. Navy will be so equipped as to permit of launching off the deck of a ship, as it has been found that the light monoplane type of machine can be accelerated very quickly particularly when equipped with a motor as powerful as the 300 Hispano Suiza, which is being used on this type of craft.

Curtiss Company Buys 2,176 Planes and 4,608 Motors

A deal by which the Curtiss Aeroplane and Motor Corporation repurchases from the Government 2.176 aeroplanes and 4,008 motors made by it during the war was announced on May 25 by W. W. Mountain, vice-president and general manager of the company.

This deal had been reported at various

inis ucal had been reported at various times as about to be consummated, but had always fallen through each time before. The contract was signed for the War Department by Major-Gen. Charles T. Menoher, head of the air service, and by G. M. Keyes, a vice-president of the urtiss concern.

The price was not announced by Mr. The price was not announced by some Mountain, but it is known that in previous negotiations the Curtiss company refused to buy the planes and motors for \$2,720,000 unless the Government agreed not to dispose of other Curtiss planes or motors. dispose of other Curtiss planes or motors to private purchasers for two years. It is probable, however, that the price paid is about 10 per cent. of the original figure. Included in the deal are 1.100 standard aeroplanes which the Curtiss people did

not build, but which they are buying in order to get back the Curtiss motors with which they are equipped.

J. A. Callahan Sped Up Curtiss Production 400 Per Cent.

Speeding up an aeroplane production programme from an output of a little more than a hundred to more than four



Mr. J. A. Callahan, manager of molor produc-tion at the Churchill plant of the Curtiss Company

hundred a month in a year's time is the record that J. A. Callahan, factory man-ager of the Curtiss Aeroplane and Motor orporation, and his organization at Buf-

falo made during the war period.

During the month of July, 1917, the Curtiss plants, comprising the Churchill Street group, produced 139 aeroplanes for the government.

the government.

The output, however, was insufficient and almost daily came requests from the government to "speed up."

On the 31st of July, 1918, Mr. Callahan had increased the production of the plants

under his jurisdiction to such an extent that the 400th plane was crated and

Mr. Callahan was born in Lockport, N. Y., in 1884. After completing his high school education he went to Buffalo, to work with the Thomas Motor Com-pany, where he advanced to manager of pany, where he advanced to manager or stores. Following this he was connected with the T. A. Gillespie Contracting Com-pany, Russell Motor Car Company and Goodrich Tire and Rubber Company. In 1915, he was made assistant super-intendent of the Churchill street plant of the Curtiss company. In a short time, he was made assistant to K. B. MacDonald. then vice-president and general manager of the company. He then took charge of the despatching for all operations and of the keeping of factory records and finally became manager of the Churchill Street

Between January 1, 1917, and January 1918, the factories comprising this

roup made and shipped 1,441 aeroplanes. group made and shipped 1,441 aeroptanes, From January 1 to August 1, 1918, this same group shipped a total of 2,365 ma-chines of the preliminary and advanced training types and specibal models. After the armistice was signed, the di-

rectors of the company decided to concentrate all efforts in combining all of the Churchill Street group—the Bradley, Ni-agara, South Elmwood and Churchill factories-into one and the Churchill plant was selected.

was selected.

Mr. Callahan is now in charge of the motor division at the Churchill plant, in addition to the aeroplane division, and the plant is now producing the famous K-6 and K-12 motors in quantity and also the new three-passenger Curtiss Oriole.

Wright-Martin to Get Order for Hispano Motors

New York, May 15.—It is reported, according to Automotive Industries, that the Government shortly may place orders with the Wright-Martin Co. for a quantity of Hipsano-Suiza engines. It is stated that the order may amount to \$5,000,000

Aircraft Claims Being Gradually Settled

Washington, D. C.—Slow progress is being made in the settlement of claims against the War Department. All of the big aircraft claims are still out and may big aircraft claims are still out and may not he filed for some time. Approximate-ly 40 per cent of the total of aircraft claims in this district have been ap-proved at Washington. Thirty per cent are now before the board and 30 per cent remain to be filed. Officials of both boards, however, predict that settlement matters will move rapidly from now on. Many points which have been holding back claims have been cleared up at Washington and new regulations are greatly simplifying the work of the board.

National Wire Wheel Works Moves to New Hagerstown Plant

Hagerstown, Md.—The National Wire Wheel Works, Inc., has moved its main office to Hagerstown, Md., where the principal plant of the company is located. The offices heretofore had been located at Geneva, N. Y.

Champion Spark Plug Company Assumes Federal Tax

Toledo, O .- The Champion Spark Plug Company was one of the first manufac-turers of automotive equipment to go on record as to how they would handle the new revenue tax of 5% levied on all auto-mobile accessories under the Federal Excise Tax Bill.

On February 27, two days after the bill became effective, the Toledo concern sent a wire to its jobbers throughout the United States advising that the Champion Company would pay the 5% tax and that there would be no change in the price to dealers. The tax is therefore not passed on to the consumer.



P. O. Dept. Preparing New Newark Landing Field

Washington, May 16.—It is stated at the Post Office Department that the gov-ernment had decided to go ahead with the preparation of an aviation field on the Heller property in Newark. A contract has been let for the pre-

paring of a sufficient space in the Heller tract to permit the landing and starting of

Swiss Aerial Mail Service Planned

the aerial postal planes.

An aerial postal service is to be organ-An aerail postal service is to be organized this summer between St. Gall and Geneva, passing by Zurich, Berne and Lausanne. A tax of 50 c, per letter will be imposed. The service wil only be temporary, experience having shown that good results are obtained even when the distance is over 600 km.

Air Mail Pilot E. H. Lee Trained Many

Stunt Fliers for Air Service Aerial Mail Pilot E. Hamilton Lee took his first lesson in the handling of aircraft

Air Mail Pilot G. G. Budwig, formerly edvanced acrobatic instructor in the Air Service, is now testing De Haviland Mail Planes

at Fort Suelling Field, Minneapolis, Minn., flying a Curtiss "pusher," and later gradu-ated from the Partridge Tractor School at Cieco Field, Chicago.

When the United States took up arms against Germany, Lee offered his services against Germany, Lee onered his services to the Government and was made flying instructor at Ashburn Field, Chicago, at the time the Fourth Aero Squadron was receiving its training there.

September 13, 1917 he was transferred to Selfridge Field, Mt. Clemens, Mich., as an instructor in stunt flying. On December 15, 1917, Lee made the last official flight 13, 1917, Lee made the last official ment of the year at this field, this being the closing day. The weather registered 18 degrees below zero, and the snow was 4 feet deep. A runway was cleared for the landing. The duration of the flight was 11 minutes.

December 23, 1917, Lee arrived at El-lington Field, Houston, Texas, and was an instructor of dual training. February 21, 1918, Ellington Field started a stage of acrobatic flying. Lee was chosen as the first instructor assigned to the stage,

(Continued on page 591)

UNITED STATES POST OFFICE AIR MAIL SERVICE

OTTO PRAEGER. Second Assistant Postmaster General.

Monthly Report of Operation and Maintenance APRIL. 1919

_		1			11			FKI			_	1	1	SE	RVICE	AND U	VIT COST	-
Aeroplane No.	Casaline	Cerane and	Office Force	Motorcycles. Trucks	Rent. Light, Fu Power, Telephon and Water	Miscellanesus	Pilote	Mechanics and Helpers	Repairs and Accessiries	Interest on Investment	Departmental Overhead Charge	TOTAL	Gallons of Gasoline	Total Time	Total Miles	Miles Run per Callon	Cost per Hour	Cost per
2 3 4 7 8 10 11 12 14 15 17 30 38 39 43 24224 39364 39365	838.05 15.79 87.84 54.59 157.17 158.06 33.96 85.15 16.70 80.36 24.41 54.07 12.00 89.79 6.99	\$7.97 1, 19 43, 49 28, 89 45, 65 69, 20 8, 92 22, 76 28 8, 26 8, 93 54 6, 15	\$45.98 45.98 45.98 45.98 45.98 45.98 45.98 11.90 45.98 21.50 34.08 24.58 11.90 34.08 9.60	\$46,54 46,54 46,54 46,54 46,53 46,53 46,53 46,53 46,53 46,53 46,53 46,53 46,53 46,53	\$20.49 20.49 20.49 20.49 20.48 20.46	\$340.03 165.03 164.02 190.02 246.02 246.02 245.02 140.02 278.02 153.13 78.02 150.02 160.02	\$68 09 27.14 106 44 66.14 235.79 308.35 75.11 124 64 22.20 105.92 64.32 7.91 44.51 2.33	\$66.41 83.75 141.35 161.30 302.%6 189.21 183.27 22.13 146.22 155.73 134.35 122.35 258.28 243.10	\$83, 29 54 33 51 53 51 94 111.08 63.14 101.04 225.00 92 59 452.73 32.65 48.09	\$67.50 67.50 67.50 67.50 67.50 67.50 67.50 67.50 746.24 46.24 46.24 46.24 46.24 72.89 72.89 72.89 72.89 72.89 72.89 72.89	\$77.50 59.50 50 50 50 50 50 50 50 50 50 50 50 50 5	\$563.85 587.24 834.68 792.89 272.03 1.317.42 1.251.79 763.06 509.80 183.92 227.68 16.448.66 824.12 236.89 1.255.16 423.24	125 51 291 180 516 1,198 112 280 54 261 80 194 40 291 29	30 39 9 15 2	15 18 31 2.8 37 3 58 1.2 50 2 2 34 1.11 4 6 40 3 17	06 5.92 00 5.66 13 2.35 11 4.83 18 4.35 38 3.85 0 4.25	169, 20 61, 20 93 60 43, 80 31, 80 79, 20 54 60 417 60	\$1.3 2.2 8 1.1 .7 4 1.4 .7 5.6 .6 .1.2 3.1 3.2 21.1
Total	\$921,95	\$252.30	\$561.36	\$537.65	\$365.69	\$1,277.49	\$1,258.66	\$2,240.81	\$1,024.25	\$1,102.28	\$1,071.00	\$13,516.44	3,702	161	11 112	97 3 11	\$84,00	\$1.1

Cost per mile, overhead, \$34; cost per mile, flying, \$22; cost per mile, maintenance, \$62. Note—Complete rebuilding of one plane is included in repairs and accessories



NAVAL and MILITARY AEDONAUTICS -



A. E. F. Trained 2,525 Pilots and Observers

Washington, D. C .- According to a statement recently issued by the statistics hranch of the General Staff, to the date of the armistice 2,525 pilots and observers were graduate from the A. E. F. advanced training schools, 77 per cent of whom were sent to the Zone of Advance.

The numbers shown in the following table are cumulative and cover the period

from the beginning of the war to Novem-

Enrolled in training courses	5,429
Sent to Zone of Advance	2.525
Losses in Zone of Advance	570
Losses in training	450

Arcadia Balloon School Named Ross Field

Washington, D. C .- The Army Balloon School at Arcadia, California, has been officially designated as "Ross Field" in honor of Lieutenant Cleo J. Ross. Air Service, killed in France near Brahrant. September 26, 1918.

Air Service Troops Rapidly Returning Washington, D. C .- On May 8 there

were 19,747 Air Service Troops on duty irr the United States, and 28,718 overseas. The net decrease of personnel of air service from November 11 to May 8 is 75 per

The Kelly Field Altitude Record

Lieutenant Fields, Jr., has added 500 feet to the altitude record made by Lieutenant Sweeley, who with Lieutenant Boggs as official observer soared to a height of 20,100 feet. The record will be submitted to the Aero Club of America for homologation under the rules of the International Aeronautic Federation.

War Department Instruction Manuals Available

Washington, D. C.-The War Depart-ment News Bureau has a set of instruction manuals issued by the Committee on Education and Special Training, available for examination, covering the following subjects: Auto mechanics and drivers,

sheet metal workers, carpenters, telephone electricians, surveyors, machinists and farriers.

Major Mannack Britain's Champion Air Fighter

The Air Ministry has decided that so I BE AIT AIMSTY PAS decided that 30 far as can be ascertained the cliampion British airman of the war was the late Major Edward Mannock. Lieutenant Colonel Wilham A. Bishop, the Canadian aviator, who won the Victoria Cross, comes next. Major Mannock brought down J entemy machines, and Lieutenant down J entemy machines, and Lieutenant

Colonel Bishop, 72.
Of all the Allies, Lieutenant Rene Fonck, the French ace, holds the record,

with 78. Major Mannock was born in India of British parents, thirty years ago, and was considered the greatest aerial tactician the Royal Air Force produced. Among his awards was the War Medal of the Aerial Club of America.

All Emergency Men to Be Discharged by Air Service

Washington, D. C .- The War Department authorizes publication of the fol-

lowing information: The Director of the Air Service is being directed to discharge from the serv-ice, with the least practicable delay, all ice, with the least practicable delay, all emergency men now being held in the service at camps and stations in the United States for parposes of training except those in the 29th Balloon Com-pany at Pt. Monroe, Virginia. The dis-duction of the state of the state of the ter of the state of the state of the ter of the state of the state of the present excent those eligible under the present except those eligible under the provisions of Circular 77, WD, 1918.

Ruling on Promotions Made

Washington, D. C.—Circular No. 79, W.D. 1919, covering promotions for the period of the emergency within the United States and its possessions, has been revoked. Hereafter promotions will be made to give ranks appropriate to the command in case of line officers or to actual employment in the case of staff officers.

No officer is to be recommended for promotion unless the duty upon which he is engaged is commensurate with the advanced grade recommended and inless there is no officer of appropriate rank reathere is no omcer of appropriate faint ba-sonably available for assignment to the duty in question. In addition to such vacancies as may be computed by the Chief of the Personnel Branch, of the Chief of the Fersonnel Branch, of the General Staff, a vacancy may be consid-ered to exist in any grade where the interests of the United States make such promotion necessary. No promotions will be made without personal approval of the Secretary of War.

Overseas Chevrons Computed from Embarkation The Secretary of War has issued directions that the computation of time for overseas war service chevrons shall include all time from the date of departure from the Port of Embarkation, U. S. A., to date of arrival at Port of Debarka-tion, U. S. A., both dates inclusive.

Aero Squadrons Designated for Philippine Service Washington, D. C.—The following ob-

servation squadrons are being organized servation squadrons are being organized to with a view to their later transfer to the Philippine Islands: 2nd Aero Squadron, Rockwell Field, San Diego, Calif.; 3rd, 4th and 5th Aero Squadrons at Haselmert Field, Minoola, L. I., N. Y. and Haselmert Field, Minoola, L. I., N. Y. and Standard of these constants of the property of the service in their present emission of the contraction of their present emission of the property of the service in their present emission of the present emi to serve in their present enlistment period and no man enlsted or drafted for the emergency will be retained in the service to assist in organization of these units or on account of their organization.

Army Seeks Aerial Photographers
Washington, D. C.—A campaign for
the recruiting of aerial photographers has
been begun by the War Department.
Many inducements are offered to recruits and the chances of advancement in the service are excellent, and flying pay is offered to those whose duties require freoffered to those whose duties require Ire-quent and regular flights. After one year of service, unmarried soldiers under thirty years of age are eligible to the grade of Provisional Second Lieutenant. Enlistments are for one or three years. Information can be obtained from any late of the provisional second of the other to the Director. Second from the Office of Photographic Branch, Washington, D. C. Photographic Branch, Washington, D. C.

Colonel Culver Receives D. S. M.

The Distinguished Service Medal has been awarded to the following officers: Colonel C. C. Culver, U. S. Army, for exceptionally meritorious and conspicuous service. To Colonel Culver's untiring energy, close application and perseverence is due the credit for having completed the coordination of the chain of events leading from the earliest conception of the Radio Telephone to the successful accom-

plishment of Voice-Commanded Flying carried through to full frution. Mr. Nugent H. Slaughter, formerly Lieutenant Colonel, U. S. Army, for exceptionally meritorious and conspicuous service in the very successful development of the cell for the colone. of the radio equipment of the United States Army.



The Curtise L-2 Triplane Single Float Seaplane

Mr. Brice P. Disque, formerly Briga-dier General, U. S. Army, for exception-ally meritorious and distinguished services rendered in connection with the organization and administration of the Spruce zation and administration of the Spruce Production activities of the Bureau of Aircraft Production, while serving as of-ficer in charge of the Spruce Production Division and President of the United States Spruce Production Corporation.

Field Officers Who Change Station

The following named field officers have been referred to change station as follows since May 1919:

Lieutenant-Colonel Leonard H. Drennan, J.M.A., A.S.A., ordered from Chrcago, Ill., to Boston, Mass., for duty as Department Air Service Officer.

Special Orders Nos. 114 to 119, Inclusive

Special Orders Nos. 114 to 119, Inclusive The appointments on April 1, 1919, of the foliosing Art Service officers, for the period of the lowing Art Service officers, for the period of the special of t

To be first literatum, Air Service: Second.
To be first literatum, Air Service: Second.
First W. Clark, Murry H. Eckmar, Henry V.
Fransworth, Charles S. Gilbert, Robert Corbonds
Literature, Company C. Leverry, John P. Malone,
France, Joseph A. Leverry, John P. Malone,
Celvin Randall, William N. Reagen, William H.
Celvin Randall, William N. Reagen, William M.
Celvin Randall, William N. Reagen, William C.
Carles S. Sutherland, George Leat Tomlinson,
Paschal Williams, No. Dr. Witner.

The appointments on April 9, 1919, of the following named officers, Air Service, for the period of the existing emergency, are confirmed: To be captains, Air Service: First Lieuts. Russell V. McMurphy, John Robert Harman, James W.

The appointments of the following named Air Service officers, for the period of the eaisting emergency, are confirmed: To be major, Air Ser-vice: Capt, Henry John Whitehouse. To be cap-tain, Air Service: First Lieut, Bertram Win-thron.

To be major, Air Service; Capt. Alvin C. Reis.
To be captains: First Licuts, Dogan Humpheries Arbait, William Heary, Carba, Harry,
Merry Cook, Reusell Stewart Bran, Huward L.
Herry, Cook, Reusell Stewart Bran, Huward L.
Herry, Horace Mon Guilbert, Edmund A. Hastings,
Pail A. Henderson, Charles C. Hicks, Samuel
Kay, Jr., Gorge Gust-falli Kenney, John H.
Lambert, Richard C. M. Fage, Robert C. Paradier, Roy S. Bropey, William C. Thomas.

duse, Roy S. Ripley, William C. Thomas.
To be fast illemiranta, Air Service: Second Lieuts. Emil L. Baffay, Joseph Francis Recker. Edward Grews Black, George Raymond Culinats. Deband, Owadd A. Echandt. Sidney Bratis Deband, Owadd A. Echandt. Sidney Bratis of Grant, Charles, P. Harrington, John W. Joseph, W. Joseph, C. Bartington, J. W. Bartington, J. W. Bartington, J. W. William Henry Leininger, Paul Jones, Battha, John Merhauf Bottonell, Charles, Smith, Brace Struthers, Eugene E. Stuck, Alexander Tolchan, Curit Wheeler.

Maj. Carl Spatz will proceed from Rockwell Field, San Dego, Cal., then to Taliaferro Field, Hicks, Tex., take station there, assume command. Report by letter to the Director of Air Service, Washington, D. C.

First Lieut, John W. Dissette, Air Service (Aeronautica), promoted to captain Air Service (Aeronautics),

Second Lieut. Isaa: B. Van Devanter, Air iervice (Acronautics), promoted to first lieuten-nt, Air Service (Aeronautics).

Capt. Lee W. Felt, Air Service (Aeronautica), now at Post Field, Fort Sill, Okla., will proceed to Washington, D. C., on tengorary dury not to exceed five days, thence to San Francisco, Cal., stendent Army Transport Service, Fort Mason, for transportation to Honolulu, Territory of Hawkin, on transport leaving San Francisco about June 5, 1119, reporting upon arrival to the commoding general Bassaian department for dury.

First Lieut. Alfred W. Martiner, Air Service (Production), will proceed to Washington, D. C., for temporary duty: there to Superinser, D. C., there is a superinser of the superinser of the Army Transport Service, Port Mason, San Fran-cisco, Cal. for transportation to Ilonolulu, Ha-waii, reporting upon arrival to the commanding general Hawaiian Department.

First Lieut. Frank B. Tidwell is announced as on duty requiring him to participate regularly and frequently in aerial flights from November 5, 1917.

First Lieut, George D. Litherland will proceed to San Francisco, Cal., and report to the general superintendent Army Transport Service, Fort Mason, for transportation to the Philippine Is-lands, reporting upon arrival to the commanding general Philippine Department.

A board of officers to consist of Lieut.-Col. Arthur J. Hanlon, Maj. Albert D. Smith, and Maj. Emmett. I. Vaughn (Medical Lopps), is ap-cided to the constant of the constant of the Cal., at the call of the senior member of the board for the purpose of examining officers or-dered to appear before it to determine their qualifications for rating as military avaiors or unior military aviators

The board of officers consisting of Maj. Theodore C. Macauly, Capt. Richard D. Gile, and Capt. R. W. Pope (Medical Corps), appointed by par, 304, S. O. No. 105, W. D., to determine their qualifications for rating as military aviators of junior military aviators, is dissolvents.

First Lieut. Rene R. Studler will proceed to Aberdeen Proving Grounds, Aberdeen, Md., and report for duty with 271st Aero Squadron.

First Lieut, Bertram E. Giesecke will proceed from School of Military Aeronautics, University of Texas, Anstin, Tex., to Kelly Field, San An-tonio, Tex.

First Lieut. Alfred R. Bellinger will proceed to Washington, D. C., and report to the Director of Air Service.

Maj. Howard F. Wehrle wilt proceed to Washington, D. C., for temporary duty, thence to Ari Service Mechanics' School, St. Paul, Minn., and assume command.

The following named officers, now at Akron, Ohio, will proceed to Langley Field, Hampton, Va.: Capt. Raymond C. Pierce, Capt. Elden P. Phillips.

Second Lieut, Allen B. Humason will proceed to Carlstrom Field, Arcadia, Fla.

Second Lieut. Charles F. Curry, Jr., will proceed to Washington, D. C., and report to the Director of Air Service.

First Lieut, Frederick W. Evans will proceed to Army Balloon School, Lee Hall, Va.

Second Licut, John L. Day is detailed for dury with the Medical Department, and will proceed to Chicago, Ill., U. S. A. General Hos-pital 32.

First Lieut, Walter J. Enright to Washington, D. C., and report to the Director of Air Service.

Second Lieut. Laland M. Baum report to rmy Balloon School, Lee Hall, Va.

(Continued from page 589)

breaking in other flyers for instructors in stunts. June 10, 1918, he climbed to a stunts. June 10, 1918, he climbed to a height of 12,100 feet and made 105 conheight of 12,100 feet and made 105 con-secutive boops landing out of the last one, using a JN4B Curtiss plane and motor (OX-5). On several occasion he flew from Ellington Field to Angleton, Texas, on hunting trips and fly back 12 or 1 o'clock at night; a distance of 75 miles. Lee has flown 15 different types of planes and 8 different types of motors.

Some of the Government aviators whom

Lee has trained have won distinction in service at the front, one being Lieut. Ralph E. deCastro, who won distinguished war cross for bravery over the lines September, 1918, and he was formerly associ-ate editor of Aerial Age.

Lee is credited with 3,000 hours of fly-

ing, 1,000 of which were spent in acro-batic flying. Barring an accident occurring during a heavy fog with no visibility and entirely beyond the control of the aviator, Lee's record is of the best, never having had an accident until April 4, 1919, mentioned above.

Pilot E. Hamilton Lee entered the air

mail service on December 29, 1918, and has an excellent record for reliability in the delivery of his cargo.



The aeroplane launching device absard the U. S. S. Texas, on one of the hig gun turrets



FOREIGN NEWS



Route of French Aerial Tauring Contest Announced

The previsional list of stages in the preliminary retals in reconnection with the safety and confort competition for which the "Eth ofe Paris" is offering 500,000 is now available. Starting from Paris, stops will be made at the following towns in France and neighboring countries: Strasbourg, Brussels, London, and so back to Paris. Brief halts will be made at other places between these points.

Aeropiene Pert of Antarctic Expedition Equipment

It is proposed to include an aeroplane in the equipment of the expedition to the Admirch which is to be made under the leadership of Mr. Expedition, 1914-17, as surgroun and biologist to the Ross Sea party. The expedition will leave this country in June, 1920, in the "Terra Nora," and return in 1926.

Inter-Scandinovian Flying Week

From the results of the recent later Sandhusstan Flying Week, according to Fifths. The results of the recent later Sandhusstan Flying Week, according to Fifths. The results of the result

Brockpopa Ascends 23,786 Feet with Three Possengera

Turin, Italy.—Lieut. Brackpapa, an Italian aviator, in an aero-plane with three passengers ascended on May 21 to a height of 7,250 metres (23,786 feet). The ascent was made in forty minutes.

PARIS, May 21.—The aviator Sadi Lecointe yesterday ascended to a height of 8.500 metrus (2.871 feet), at the Villacoublay according establishing a French record for height. This is only 29 feet short of Major Schroeder's record.

Aviator Delivers Lecture from 5,000 Foot Altitude LONDON, May It.—At an altitude of 2,000 feet a British aviator gave a lecture by wireless to members of the leastinte of Electrods to the New York Sun. Mail in Leidon, 1922 a copyright dispatch to the New York Sun. Mail in Leidon, 1922 a copyright dispatch After describing the light from his position in the air the aviator. The property of the position of the property of the pr

Air Ministry Reports on Expenditures

A fee detail of the expenditure of the old AIR Board and the Air Minister (white 10 to 10

African Factory Contributed to British War Production

The works of the Maisen J. Donnet at Sidi-Abdallah, Ferryville, Tunis, which are managed by Mr. Jeltes, and have turned out a number of Donnet Sping boats during the war, almost tentirely by means of Moorish labor. The boats are assembled in the sheds and mounted on trollies on a railway. When passed on sready for use the engines are started

and the machines propel themselves under their own power along 1,000 metres of railway down to the Lagoon of Bizerta, where they are launched direct off the trollies.

Martinsyde Plane Flies from London to Paris in 75 Minutes

London-Area record for the London-Prix flight has been exhibited. Stating with dispatches from Hendon Aerofone at 1250 and on April 8th, and following the Droppe route, involving a nor crossing of a first the dispatch of the Control of the Contro

Lyons to Turin in 21/2 Hours

Leaving Lyons in a gale, three Italian military pilots, in a 600 h.p. aeropiane, on April 23d flew aeross the Alps and landed safely at Cambiano, near Turin, the trip having taken two and one-half hours. On the way they encountered a heavy show-atoms,

Argentine Sends Aeranautic Mission to Great Britain

On May 5th there arrived in England an Argentine aviation mission composed of Captains Brihuega and Zuluaga and Enginer Paravella. The mission will visit most important flying schools and factories.

To Cover Vaudeville Circuit by Air

According to a British acronautical journal, Mr. Frank Allen, manag-in According to a British acronautical journal, Mr. Frank Allen, manag-pany to supply him with a machine ensable of carrying two passengers and pixed at 100 to 120 miles per hour, for service upon the Most Tour As soon as the official bon upon commercial and private flying in re-moved an experimental flight will be made.

Madrid-Seville-Madrid Flight in 4 Hours

Major Geoffrey de Havilland, R.A.F., who is sojourning for a time in Spain, has flown from Madrid to Seville and back, a distance of 480 min. The machine used by Major de Havilland while giving exhibitions of flying was a De H 9 biplane with a 450 h.p. Napier engine. Major de Havilland is well known as the designer of the famous Arton machines.

Aerial Transport for Portugal

An aeroplane service will fly this summer between Barcelona and Lis-bon via Madrid, Oporto, and Coimbra.

5,000 Farman Planes Tested Without Accident

Paris.—As evidence of the safety and reliability of aircraft, the record of Farmus brothers, famous aeroplane construction, is of interest. All whole period of the war they have not had an accident to ether pilot or machines in their reception tests or subsequent delivery to the army, and they supplied well over five thousand!

Chinese Government Orders Handley Page Planes

London.—The Handley Day. Commany has revived an order through its agents, the Point Syndiest, or the supply of machines and personnel to the Chinese Ministry of Communications.

The first machines senting the communications of the Chinese Ministry of Communications. The communication of the Chinese Ministry of the Ch

Brussela-London-Paria-Brussela Flight in 7 Hours 20 Minutes

Piloted by Lieutenant Georges and carry-ing two passengers, a Belgian two-engined army acroplane has accomplished a circular flight from Brussels to Longon and Paris and back to the starting point, about 570 miles, in 7 hours, 20 minutes actual flying time.

First Cargo Carried in Foreign Trade hy Aeroplane Reaches Hovane

Havana, May 20.—The scaplane Sunshine, the first scaplane chartered for freightering the first scaplane chartered for freightering the first scape of scape. The Sunshine was chartered by S. S. Fredlein, a Havane merchant, and the cargo came on a regular manifest with consular papers similar to those issued to

consular papers similar to those tower u-ships.

The cargo did not pass the Havana Cus-tom House, however, because the seplane landed at Marianas Beach, and the boliday habters there caided the plan and seried its abstern there caided the plan and seried its were an American, John Green, owner of the Sunshine, and Augustin Paria, a Cuban, formerly nf the Cuban Army,



Austrien Lohner Flying Boat, many of which have been surrendered to the Itelians



ELEMENTARY AERONAUTICS

MODEL NOTES By John F. NSMahon



Pacific Model Aero Club Contest

The Pacific Model Aero Club is now an auxiliary of the The Pacific Model Aero Club is now an auxiliary of the Pacific Aero Club and have just completed a very successful meet. Mr. Irvine of the senior Club is one of the board of directors of the junior body, as well as Mr. W. F. Hopkins, a gasoline motor designer, Mr. Mehre, a manual training instructor, and Mr. H. E. Hansen, brother of the President of the model club. It is the rule of this club January and the property of the part of the senior of the country and the part of the 21 years of age.

The following officers of the new club hold office for one year from April 30, 1919: Raymond C. Hansen, President; Theodore Morse, Vice-President; J. Laurence Irwin, Secretary, and Ray Ashley,

President; J. Laurence Irwin, Occreatry, some bay interesting in Treasurer.

Treasurer: In the signified it intention of starting in the Thin Acr. Model Aeroplane contents and have entered the following team: Noble Heuter, Earl Vivell, Theodore Morse, Ray Ashley, Ralph Vincent, Laurence Pinkpank, Preston Hopkins, George Mullins, Raymond Eying, Edward Mascone, Raymond Fife, of Venice, Cal.; Daniel Tuthill, of Oakland, Cal.; Cleon Calloway, of Valego, Cal.; George Ashley, Howard Call, Cleon Calloway, of Valego, Cal.; George Ashley, Howard Laurence Irwin, Harold Hansen and Heubert Burgess.

Morse, Raymond Hansen, Fred Geryine, Joseph Gutman, Laurence Irwin, Harold Hansen and Heubert Burgess.

The accompanying photographs show a meet being held by the control of the property of

owner's home and it quickly rose to 300 feet and helped by the wind disappeared over Golden Gate Park after circling around in the air for about four minutes.

Another copy of this model was built with 24" propellers but it broke in the air under the strain of a heavy wind. A picture of this machine in flight high in the air was

received, but it would not stand reproduction as it was too faint.

Theodore Morse flew a model weighing only 1.50 ounces for 2500 feet in 100 seconds. The propellers were 10 inches in diameter. Three strands of 3/16x1/32º flat rubber was used on each propeller. The main plane measured 25x5° and the front plan 10x3°.

More is expected of this Club and I would not be surprised to see them well up in the contest for the AERIAL AGE prizes. Although they are a new club, they have made wonderful strides and, from their records, they will soon be at the heels of the Illinois Model and Aero Science Clubs.

the ilmost success and reto 'schelle' class.

It is intesting to study the model shown in Mr. Hausert, that in the strings and the strings and the strings model he can think of, and wonders why good results are few and far between. Later he gets a glimpse of a successful model of the flying stick type and from that time on, improvement is rapid as will be noted from the results received from most of the smaller clubs in the country.

The model shown here is the right type of racing model and a good one to copy. The Lauder model shown last week is the forerunner of this kind of model, as are those built by

the Chicago boys for the past two years.

The Christofferson Junior Biplane

The little machine shown in the cut to the right was built

The little machine shown in the cut to the right was built by H. P. Christofferson, San Francisco, Cal, in such a way as to be inexpensive and simple to construct. No expensive material is used and no wires or fittings are used in the fusedage in back of the pilot's seat.

The wing spread is 25 feet, and 31 inches. The wine great is 25 feet, and 31 inches. The futedage is built up of plywood sections. The complete weight is only 275 lbs. The power plant is an ordinary Indian motorcycle engine, with standard cams, ports, etc. A reduction gear allowing the engine to turn up to 3000 to the propeller 120 R.P.M. is used. Overheating was eliminated by the use of machine was built for the price of a good motorcycle, or about \$400. It has 175 square feet of surface, and a speed of 40 miles per hour. It has satck and foot har control. It is easy to construct and easy to handle for a novice and the tirse double tube clinchers. The landing gear is made of steel tubing and fitted with shock absorbers. It has a two-gallon gravity tank over, the engine.

two-gallon gravity tank over the engine.

The machine is shown well up and apparently flying with ease and without trouble.









Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

(Dear Reader:—We have tried to keep you fully informed on the subject of prohibition and aeronautics. Our esteemed British contemporaries have devoted considerable space to the subject. We take pleasure in presenting to you the musing of Adbrey England written after reading of the establishment of the passenger carrying service to the Bahaman, as published in Afroraft.)

In the morning, feeling thirsty, to my hangar I repair, Get my spad out, tune the engine, take her leaping through the air:

Leave the "ferry" singing gaily, full of hope and full of cheer, There's an inn in the Bahamas where I know they sell good beer.

Prohibition nearly killed nie-many a noble man it's slain; But I laugh at all life's worries, since I bought my aeroplane. There's a girl who's waiting for me, and can hear me from

Standing waiting with a beaker by the barrel in the bar.

There's no rule was ever written that the pen could not erase, And so long as I'm a flyer I can beat the latest craze, Speed my 'plane to the Bahamas, where in joy I'll glide right down

To the beer of good Old England in a tavern in the town.

-Anbrey England.

Old Mother Hubbard

Old Mother Hubbard went to her hangar To give her pekinese his morning spin But when she got there The hangar was bare For a thief in the night had got in.

Little Jack Horner
Is now quite a goner
From flying too awfully high;
He was heard to condole,
After he'd lost all control,
"What a doggone fool am I."

Clergymen Protest Against Sunday Flying

Washington, D. C., Friday (Associated Press dispatch).— The Sunday observance issue raised by the protest of churches and clergymen in many cities against flying circuses and exhibition of moving pictures in connection with the Liberty Loan was met by the Treasury in a decision to leave the question to each community affected. The Treasury has been flooded with protests against Sunday flying.

(In this connection, attention is called to the sin of breathing the air on Sunday. While this sin is not as flagrant as the one mentioned above, it should receive the attention of our guardians of morality).

Facing the Inevitable

"Jim," said the pilot, "we're going to do it; I can see the outlines of dear ould Oireland."

"That's so," mused the observer. "We've crossed the Atlantic: but why are you so melancholy about it?"

"I'm thinking of all those reporters who'll be waitin' for us, What am I going to tell 'em, Jim? Fact is, I can't remember having done an eventful thing in my life."—From Aircraft.

Late News from Count Zeppelin

"When! But it is hot. I wish I had one of my airships to fly away in."

"You shut up, Count Zeppelin," said his Satanic majesty.
"You know as well as I do that your gasbags met hell halfway to Britain and couldn't stand it. What's the good of
talking about impossibilities?"—directal.

I asked my mother for fifty cents
To fly in an aeroplane over a fence,
But it flew so high, that it reached the sky,
And never came back till the 4th of July.

There was a young lady named Hopter,

Who invented a new helicopter;
She rose up all right:
When she tried to alight,
It made for a ditch, and there flopt 'er.
—From Aircraft.

Hey diddle diddle, my plane is a divvil And with it I'll hop o'er the moon; Other pilots may laugh and hand me the gaff But I'll show them all up very soon.









The AIRCRAFT AD-VERTISING AGENCY, INC. aims to cover the advertising field for aeronautics, including:

DISPLAY ADVERTIS-ING for General Advertisers on Dirigible, Kite, and Spherical Balloons, Aeroplanes. Streamers from Aircraft, and by the dropping of Souvenirs and Handbills from the Air:

PREPARATION of COPY and SKETCHES and the PLACING of AD-VERTISING for manufacturers of Aircraft, Accessories, and Aviators' equipment in aircraft and other periodicals.

AERIAL PHOTO-GRAPHS of Cities, Summer Resorts, Country Places, Real Estate Developments, Etc.

RATES ON APPLICA-

THE members of the Aircraft Advertising Agency, Inc. are all ex-officers of the United States Army Air Service, with both theoretical and practical knowledge in the Aeronautic Field, assuring export service for clients.

GRANVII.LE A. POLLOCK, President of the Aircraft Advertising Agency, Inc., previously to his release from the Army with the rank of Captain, served in the war from its beginning and was a member of the famous "Lafayette Escadrille." In addition to this war aviation service, Captain Pollock is by profession an aeronautical engineer.

S. HERRERT MAPES, Vice-President of the Aircraft Advertising Agency, Inc., is another Air Service Capstain who has recently laid aside his uniform after having served in important capacities at various aviation training fields in this country. He is well known as an automobile racer, an exhibitor of saddle horses and a winner of Horse Show Blue ribbons, as well as being a member of many prominent clubs.

REED GRESHAM LANDIS, of Chicago, son of Judge Kenesaw M. Landis, is also a Vice-President of the Aircraft Advertising Agency, Inc. Besides having been a Major in the American Air Service, he has the added distinction of being the second ranking American "Ace" with 12 Air Victories to his credit.

WILLIAM MENKEL, Secretary of the Aircraft Advertising Agency, Inc., also served as a Captain in the Air Service, holding various positions at Washington and in the field, including that of Commanding Officer of the Aviation Repair Depot at the Speedway, Indianapolis, Ind. Previously to entering the service, Captain Menkel was for more than 15 years associated with the American Review of Reviews.

The Aircraft Advertising Agency, Inc. is now booking the space for exhibitors at the Second Pan-American Aeronautic Convention and Exposition at Atlantic City, N. J., May 1 to June 1, 1919, and also has charge of the preparation of the elaborate souvenir Program, advertising rates for which may be had on application.

The Aircraft Advertising Agency, Inc. also controls advertising space on Aeroplanes, and kite and Spherical Balloons operating from the permanent Aviation Field at Atlantic City, N. J., and on the 36,000 square fort of Bill Board space on the fence of this Aviation Field.

(Continued from page 574)

ter J. Pyeatt, St. Lonis, Mo.; Private Justin D. Dorbant, Houston, Tex.; Private Hayes S. McMurray, Spokane, Wash.; Private James Smith, San Francisco, Cal.

Some of the naval aviators were: Lieut.. (J. G.) Harry E. Adams, Pensacola, Fla.; Ensign Hugh J. Adams, Pittsburgh, Pa.; Ensign Spencer T. Alden, Fort Wayne, Ind.; Ensign lunius F. Andrews, Durham, N. C.; Ensign Edmund B. Barry, Rochester, N. Y.; Ensign Louis Bergen, Long Island City, N. Y.; Ensign Arthur L. Boorse, Birmingham, Ala.; Ensign Milton D. Brice, South Minneapolis, Minn.; Lieut. (J. G.) John S. Buchanan, Boston, Mass.; Ensign Thomas W. M. Draper, Brighton, Md.; Ensign Philip B. Frothingham, Portland, Me.; Ensign Benjamin L. Lee, Jacksonville, Fla.; Ensign Erie Lingard, Annisquam, Mass.; Lieut. Kenneth MacLaish, Blencoe, Ill.; Ensign Allen L. Nichols, St. Paul, Minn.; Ensign Phillip W. Page, Washington, D. C.; Ensign Lloyd A. Perry, Oconomowoc, Wis.; Ensign Stephen Potter, Detroit, Mich.; Ensign Edwin S. Pou, Smithfield, N. C.; Ensign Harold A. Pulliam, Lexington, Ky.; Ensign Curtis S. Reed, New York; Ensign Fred Eries, Aurora, III.; Ensign Daune H. Ruttledge, Robelin, La.; Lieut. (J. G.) Arthur Fuller Souther, Cleveland, O.; Ensign Albert D. Sturtevant, Washington, D. C.; Ensign Elmer B. Taylor, Cedar Grove, N. J.; Ensign Hugh Terres, Kensington, London; Ensign M. Terrier, Baltimore, Md.

The aeronautic authorities assembled at Atlantic City for the Pan-American Convention are keeping close touch with the Trans-Atlantic flight and have issued interpretations of the value of the achievements of the Trans-Atlantic fliers, which have been printed the world over.

Scores of technical papers of great value to the aeronautic movement have been presented to the convention, which will be published in future issues of AFRIAL AGE.

Great interest has been manifested at the Airport by the arrival of two Sopwith machines. The machines will be piloted by Capt. Mansell R. James, late of the 45th Squadron, R. A. F., and Lieut. Alan L. Clark, 46th Squadron, R. A. F.

They will fly two machines of a type never before seen in America. These are Sopwith Camels, so called because of the hump for the Vickers machine gun mount in front of the pilots seal. The planes, which are owned by the two pilots in partnership with Cecil James, a brother of the Captsin, were landed in New York from the Ordun on May 12 and immediately brought here to be made ready for the prize flights.

It is the avowed intention of James and Clark to make their first flight from here to Boston, 350 miles, on a straightaway. They intend to return here the next day, and on the following day to start out for Cleveland and Detroit, winding up at Toronto. In all these cities, eash prizes will reward the best flights from Atlantic City during the month, and the records will count also for the Publicer Trophy.

The Sopwith Camel is a very light single-seater, with a wingspread of twenty-nine feet and an overall length of nineteen and one-half. Its power plant is a nine-cylinder Bentley rotary motor, air cooled, rated at 150 to 175 horse-power. The ordinary gasoline capacity is twenty-five gallons, but extra tanks now being installed will double this. The crusing speed is 120 miles an hour, with a maximum of 140.

The Camels had a distinguished war record, having been used by some of the most noted aces. James himself is a war pilot of distinction, having been officially credited with nine Teuton planes on the Italian front. He was downed himself on the Cambrai front, in December, 1917; was in several German prisons, and three times escaped and was recaptured. He is twenty-bree and Clark is twenty-one.

James took up one of the Camels for a try-out flight of twenty-five minutes and flew to an altitude of 6,000 feet, passing out of sight of spectators. On the return he raced around the Airport Field; to show the speed of his mount.

"Come along and Fly, you don't need to be afraid, for we will insure you. Don't miss the experience. It will make your trip to Atlantic City worth while."



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FOURTEEN VITAL POINTS

THAT MUST DOMINATE IN THE RECORDING OF THE (AERONAUTICAL) HISTORY OF THE U. S.



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Two Flyers Fall 200 Feet to Death .- (N. Y. Times)

"Atlantic City, May 24.—Berryle H. Kendrick, pilot, and James H. Bew, Jr., a passenger, were instantly killed this evening. E. Kenneth Jaquith, Kendrick's business associate and flying partner, said he could give no explanation for the tragedy other than that it was due to accident."

But there's a reason, and there is a remedy, which if generally known would cause a public demand for substituting these dangerous, untable types with a stable and safe airplane that will not "nose-dive." somersault, "side slip" or "tail-spin" to these numerous deaths.

Send for the reason and remedy today. Get posted, and then boost for the safe machine.

LAKE AERO CORPORATION

886 MAIN STREET BRIDGEPORT, CONN.

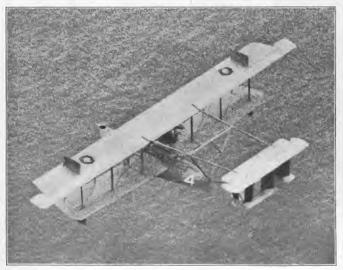
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Vol. 9, No. 13

JUNE 9, 1919

10 CENTS A COPY



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Greater Development of American Aeronautics
Urged at Atlantic City Convention

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GREATER DEVELOPMENT OF AMERICAN AERO-NAUTICS URGED AT ATLANTIC CITY CONVENTION

THE country and the press are applauding the Second Pan-American Aeronautic Convention. For thirty-two consecutive days this convention, with the demonstrations at the Atlantic City Airport, has been educating the country to the marvelous future of American aeronautics, and has aroused interest in aeronauties among the hundreds of thousands of people of different lines of endeavor.

sants of people of different lines of endeavor.

The representatives of thirty-two countries that this was.
The representatives of thirty-two countries that this was the greatest and most constructive convention ever held. The fact that the Convention and Exposition resulted in the sale of not less than 150 aeroplanes is an evidence of the tremendous public interest created. It has given American aeromendous public interest created. It has given American aeronautics a new start, a veritable flying start,

Urge Greater Aeronautical Development

The eonvention adopted resolutions urging upon Congress the adoption of a liberal program of the development of aero-nauties, including the establishment of engineering schools in every state along the plans of the state agricultural colleges and experiment stations to do for aviation what the latter have done for agriculture.

The resolutions, which received the unanimous endorse-ment of the Aero Club of America and the Aerial League of America before it was introduced and passed amid much enthusiasm, read:

"Whereas, It is universally conceded that the development of the natural resources of the United States, together with the encouragement of American industries and commerce of all kinds, is one of the most vitally important matters for the consideration of the Special Session of Congress, and

"Whereas, It is obvious that organized engineering and industrial research is one of the most important and necessary factors in such development of our natural resources, industries and commerce, and

"Whereas, The art of flying has been so far developed that the use of flying machines of various kinds has taken a permanent place in the commercial life of the nation as well as in the equipment of the American Army and Navy, and

"Whereas, the art of flying and the devices for flying and minimizing the dangers of flying have only begun to be developed, and need the broadest encouragement, and

"Whereas, The establishing of engineering experiment sta-tions in each state and territory for the promotion of engi-neering and industrial research as a measure of industrial, neering and industrial research as a measure of industrial, commercial and naval progress and preparedness in time of peace or war and an analysis of the peace of war to the attention to the peace of the peace of

"Whereas, There is a bill before the Special Session of Congress, known as the Smith Howard Bill, proposing the stablishment of the said engineering experiment station, the work of which includes aeronautics, aerodynamics and many other rusearches and investigations bearing upon the art of

flying and the production of materials needed in the art of

Therefore, Be It Resolved, That the Second Pan-American Aeronautical Convention, in executive session, Atlantic City, New Jersey, express its manimous endorsement of this Act by the Congress of the United States in making appropriations for the establishing of the proposed engineering experiment stations, and also the hope of this body that Congress will by this Act give this encouragement to American engineering and industrial research without further delay."

The resolution followed the report presented by Henry

Woodhouse.

"The flight of the NC-4 has opened the way for non-stop transatlante flights," said the report. "But it is evident that to make such voyages it will be necessary to revolutionize aeroplane construction.

"A flier capable of crossing from Atlantic City to Paris, for instance, will have to be three times as large as the NC-4. One of the most important features of the NC type machines One of the most jumptant electric times 23 large as the NC-4. One of the most important electres of the NC type machines in the control of the most important electric times are the maximum lift per square foot of wing surface in acroplanes heretofore has been only nine pounds to the square foot. These four pounds represent a great gain when it is considered that the NC weighs more than 25,000 pounds. This gain makes it possible to think of binding an author an exceptance will have to think of or over 100,000 pounds, including the commercial load, and therefore it will require not less than 10,000 square feet of wing surface.

This can be done, although it will require a different arrangement of the wings from that now followed in aeroplane will have the most point of the wings from that now followed in aeroplane wing span of 171 feet and a chord of over 28 feet. But these dimensions are unwieldy, and anyway, we are not going to stop with a machine that will lift fifty tons.

The only way to get them is to have more planes or wings.

stop with a machine that will lift fitly tons.

"The only way to get them is to have more planes or wings.
Caproin has done this with his great triplanes. But is there
any reason why we should stop with three wings? Why not
have four, five, or a dozen? The idea of tandem wings was
applied by Professor Langley in his plane many years ago,
and therefore it is not new, nor is the idea of multiplanes.
But to apply these ideas to the construction of large machines; involves solving new problems.

involves solving new problems.

"How are we going to construct a body or fuselage for this multiplane? We must provide spaces for cargo in such locations so as to make them readily accessible and at the same time to make the movement about the center of gravity of equalized, in order to prevent undesirable frying defects. The problem of fuel storage is also present. The machine would be multi-motored, and the location of these motors and their fuel supply will involve a large amount of careful planning.

"Furthermore, if our plane is to be a passenger carrier, comfortable quarters must be provided. Here again we must should reve to locate our passenger to should reveal to locate our passenger to should the vould observed.

should try to locate our passengers so that they could obtain

an unimpaired view, since this is one of the supreme joys of an air voyage. The type of multiplanes will also involve problems. If it is to be a flying-boat type, it must be made strong and sea-

is to be a flying-boat type, it must be made atrong and sea-worthy, and at the same time not unduly heavy. If we are planning a land machine the landing gear must be propor-tioned to withhand the heavy loads, with a good factor of safety, and yet not offer too much air resistance in flight. "We recall that the Avron triplane at the Boson-Harvadi meet, September, 1910, had the tendency to topple over at the triplanes and quadruplanes. But the height of aeroplanes has gone up, and although the prejudice still remains, the height of aeroplanes is increasing year by year. The Porte triplane is over 27 feet 6 inches high; the Caproni triplane is over 19 feet high; the Golba-Zepoplin is 21 feet high; the Voisi triplanes 18 to 19 feet high; the Handley Pages are 18 to "But there is a limit to the piling of one plane on top of another for the reason that you soon make the machine so toplevaxy that it is hard to 19 and almost impossible to land

another for the reason that you soon make the machine so topheavy that it is hard to fly and almost impossible to land without turning a somersault. So we have got to find some other way of arranging our extra wings if we are to have them. If we tried to build a triplane with 10,000 feet of surface it would have to he about 50 feet high, and 1 shouldn't like to be in it when it tried to land.

"But suppose we make it a quadruplane, and instead of putting our four wings one above the other we put one pair in front and another pair back of them. We can go on adding more wings at will, grouping them in sets so that we can increase the lifting surface beyond anything that is considered possible now and yet without making a topheavy machine. It is up to our aeronautical engineers to work out these problems, and I prophesy that they will do it in the near future.
"Congress should allow the funds necessary for the Army,

"Congress should allow the funds necessary for the Army, Navy, and Post Office to conduct the experiments necessary to develop these huge planes. To the Navy these large planes to develop these huge planes. To the Navy these large planes that the property of the planes of the Navy these large planes to the Navy the N problems of transportation

Aerial Forest Fire Patrol

The aerial timber "cruiser" is the newest commercial development of the aeroplane and the flying boat. Vast tracts in the northwest, rich in mineral deposits and fine timber, are shortly to be placed under the scrutiny of experts through the use of aircraft, contracts for such surveys having already been awarded to the pioneer commercial air line formed for that purpose, according to Lieut. Col. R. B. Girouard, a Canadian engineer-flyer, speaking before the Second Pan-American Aeronautic Congress.

"The possibilities of the flying boat and hydroaeroplane as a means of transprotation into the interior of Canada is becoming more apparent every day. It gives a unique op-portunity for the hundreds of trained flyers who received their schooling during the war. The owners of big timber and mineral tracts are recognizing now that the flying machine offers the quickest, easiest and cheapest means of securing the nformation that will lead to the development of the richest kind of territory.

"Heretofore it has been necessary to send out experts and guides to make these prospecting trips. It was arduous work that entailed great expense and months of travel. But now aircraft are preparing to change all of this. The flying boat and the hydroaeroplane are the logical means of mapping out and investigating the resources of this country, because more than twenty-five per cent of the area is water, and there is good landing always in sight on the rivers and lakes to which

the flyer could drop at any time.
"The plan being followed out is to divide the areas up into blocks that are numbered. The eruiser flies to the particular block he wishes to prospect, secures samples of the minerals block he wishes to prospect, secures samples of the minerans or timbers and in addition to laying out maps also secures aerial photographs, so that when he returns to the headquar-ters of the projecting company he is able to show not only the products, hit also by actual photographs point out how the the products, Init also by actual photographs point out how the suff is located and point out the best mean of transportation. Sufficiently, the product of the product of the properties of the prospecting is to be carried out on shortly, the contracts raving already been signed.

"Reference to the Dominion and Provincial Geological re-ports will satisfy anybody of the great possibilities of this

north country, especially in Northern Quebec and Ungava. Twelve years ago the Outario Government projected and built the Temiscamingue and Northern Ontario Railway from North Bay to Cochrane, resulting in the opening np of the famous Cobatt Silver area and the Porcupine Gold Fields and famous Coball Silver area and the Porcupine Goid reids and the Abitio Cay Belt were added to agricultural areas of Ottario and timber and pully wood limits were thrown open east into the Province of Quebec are as yet undeveloped. In fact, I might say, unexplored, but the reports brought in by surveyors, geologists and sportsmen all tend, to prove that surveyors, geologists and sportsmen all tend to prove that Northern Quebec has at least the same possibilities as Northern Ontario.

"The projection of railroad surveys, the traverse of rivers



President Alan R. Hawley, of the Aero Club of America, Secretary Augustus Post, and Mr. Henry Woodhouse greeting Capt. James at the Atlantic City Airport.

and lakes by aerial photographs, in fact, the securing of in-formation in detail heretofore impossible to get, except in a very rough and general way—information valuable to the government, the investor and the public at large, is awaiting the

"The prospects not only hold good for the timber and minerals, but in the transportation of valuable cargoes of turs and fish. You read only the other day of a Canadian aviator making a trip from the interior of Canada to New Jersey with an aerophane full of fine petis."

Duplex Telephony Demonstrated

First public demonstration of wireless duplex telephony was given before officials of the Convention through a small was given before oftenats of the Convention through a small system installed by experts of the General Electric Company. The instruments, connected up in the Atlantic City Area (bub, were employed to receive and send telephone messages to the cruiser "Kosemar," anchored in a basin a half mile from the clubhouse, Earl Ovington, an engineering wizard of the Curtiss Company, owner of the boat, collaborating with the curries Company, owner of the loat, contanorating with the other demonstrators. The audience was first permitted which the modern telephone with wire councetions is used. Later a musician was placed aboard the cruiser, and when he played a solo, it was delivered to the audience at the club-house through an amplifier.

nouse urrough an ampliner.

Mr. Alexanderson, inventor of the new system, described just how the instrument worked. In explaining the new wireless apparatus he said: "Just imagine a man standing a hundred feet away from you, trying to talk to you in a whisper, and then a second man alongside you, with a megaphone, talking at the top of his voice into your ear. You wouldn't have a chance of learing the whisper. Yet this is just the condition which confronted us when we tackled the problem

of duplex wireless telephony.
"As developed during the war, the wireless telephone made as a cereiopen during line war, the wireless telephonic made in necessary to have a switch and throw from receiving to transmitting in order to operate. In other words, when a man wanted to talk on the wireless telephone he would throw a switch, say to the left, and that would operate the transmitter. When he wanted to receive the spoken word from that the other station he would throw the switch to the right and that would throw in the receiver. But he could not receive a message and talk at the same time as you can on an ordinary telephone. When you receive and talk at the same time, that is called duplex. In the case of the wire telephone it is a comparatively simple matter, as you can lead the current along the wires, lut with the wireless phone the current comes through the ether of space, and the powerful trans-mitting current swamps cut the delicate receiving current, so that the two cannot operate under ordinary conditions.

"In duplexing by wireless, powerful transmitting currents go out from the station, and at the same time the delicate receiving currents come in. The problem is to so adjust things that the receiving instrument is dead to the transmitting currents which go out from its own station, but receives the signals from the distant stations. And as its own signals are, of course, right next to it, they are very much more power-ful. In other words, the most powerful signals must be blotted out, or counteracted, and the delicate signals from the



Lieut. Alan Clark and Capi. M. R. James, the Sepwith pilots at the

distant station received. And that is the problem which confronted the wireless telephone experts, and that is the problem which they solved."

Sopwith Demonstrations

Sopwith Demonstrations
Lient, Alan Clark, late of the Royal Air Force, thrilled
throngs with the stunts he performed with a Sopwith "Lamel"
as one of the final tests of different type machines for commercial adaptability of the Second Pan-American Aeronautical Convention. The machine, which was immediately
dubled the "flitter," skidded through the atmosphere with
such terrific speed that the operator was able to stand it. directly on its wing tips in a vertical position in making banks and on the straightaway it showed twice the speed of other machines hovering over the field.

The Sopwith climbed 5,000 feet into the air in a twinkling and then Lieut. Clark put it into a tail slip with its nose pointed straight up. The machine spun around like a giant top for a full minute, then dipped suddenly into a nose spin for a 2,000foot gimlet toward earth, from which level it was permitted to go through all the stunts that made such wonderful records for the scouter on the Italian and French fronts,

Parachute Demonstrations

The convention held the final tests last week for the mail delivery system from an aeroplane with the use of "petite" parachutes, each capable of carrying the weight of 1,000 letters, more than would be the average delivery at any one com-munity along an aerial mail route. The aeroplane of Eddie ters, more than would be the average delivery at any one com-munity along an acrial mail route. The aeroplane of Eddie munity along an acrial mail route. The aeroplane of Eddie Jean Ors, inventor of the pagachute, released six parachutes in a row at second intervals. They clustered after their re-lease and deposited 25-pound bags of sand within a radius before the expective of the parachute mail tests with the idea of securing their adoption for the sky mail routes. With their adoption it is certain, officials declared, that the delivery of mail will be greatly expedited, because the aeroplane mail express will be able to continue its flight without slowing up.

There were further demonstrations of aerial life preservers, the Watkins and Ors type parachites being used with great success in dropping out passengers from varying altitudes to a safe landing on the field. George Weiss, of Pittsburgh, a former navy balloonist, tested out the Watkins chute while Warner Genot, a Belgian, leaped from speeding aeroplanes

with the Ors chute.

Because the students at the big colleges were busy with their Decause the students at the tig coneges were user with the finer-nial examinations, it was necessary to postpone the Inter-collegiate Aeroplane Contests. They will be renewed the last Saturday in June, and be continued each Saturday for the balance of the summer. Yale, Harvard, Dartmouth, Pena-sylvania, Princeton, Colorado, Columbia, Amherst, California and Tufts are to battle it out for the supremacy of the air during the summer here, both over land and sea, in the land and scaplanes.

Constructive Service to Aeronautica

A remarkable case of devotion to the aeronautic movement was revealed at the Second Pan-American Aeronautic League of America's Diploma of Honor to Mrs. A. S. Abell, of Baltimore and her five sons, two daughters and her daughter-in-

law. Every one of the following nine members of the Abell family are members of the Aerial League of America: Mrs. Arunal Shepardson Abell, Mr. Arunals Shepardson Abell, Mr. Arunals Shepardson Abell, Mr. Arunals Shepardson Abell, Jav. Abell, Jav. Walter William Abell, Abel, Jav. Awardson, Abell, Awardson,

The five sons are also members of the Aero Club of

The oldest member of the family, Mr. A. S. Abell, 3rd, is 26 years old; the youngest member is Miss Marie L. Abell,

2b years old; the youtness memoer is associated to who is only for years old, which is well followed serious council to the years old, which is well flower through its being connected with the Baltimore "Sum," has followed seriousites for the past ten years, every member being interested in it, and they all came to Atlantic City for the Second Panamerican Aeronautic Convention and Exposition, where they have stayed for the entire convention.

they have stayed for the entire convention.

As there are to be conducted extensive scientific contests and demonstrations of the application of aircraft for differation of the contest of the contest

to be competed for annually in races between Atlantic City

and Baltimore. The trophy was presented through the Aero Club of America and Aerial League of America, who will draw the rules for the competition.

Throughout the war the Abell family has participated in, Infroughout the war the Aueri taminy has participated in, and supported in many ways the progressive work of the Aero Club of America and the Aerial League of America, which contributed so extensively to the building of the American Air Forces, and assisting American Airmen in many ways.

many ways.

Rear-Admiral Robert E. Peary, the President of the Aerial League of America, was to present the Diploma of Hopor to the Ahel family, but his illness prevented his coming to Atlantic City from Washington. In sending his regrets he stated that Mrs. Ahell and her he sending his regrets and daughter-in-law have set an example which American families onght to follow at his crucial time in the history of American aeronantics, when unless the American public sup-ports the aeronautic movement in every way possible, America will again fall behind other countries in this marvelous field of human endeavor.

of human endeavor.

Mr. Alan R. Hawley, the President of the Aero Club of America, who took the place of Admiral Peray in making the place of Admiral Peray in making the place of the most implicit factors to him and other active workers in the Aero Club of America and Aerial League of America.

Aerial Photographic Bombardment

The resort's beachfront was "shot up" hy an automatic camera giin that "mowed down" promeinaders along the Boardwalk with the same precision and rapidity of a machine Boardwalk with the same precision and rapidity of a machine gim. Mounted with a swivel arrangement on the cowl of a Curtiss scaplane, the camera, an invention of E. C. Bass, of New York, registered "bull's-eyes" up to 5,000 feet when operated by Mr. Bass.

The camera has many of the characteristics of a regular machine gan, being sighted as quickly and by the same methods and operated by a trigger that pumps the "shot over at the rate of the fire of the best machine gus. The shots were made singly and in bursts, the shutter continuously while the fugger was on the trigger

or making a lone picture on "sniping" shots.

The Bass camera gun is a day-light loading device, making

it possible for the "gunner" to snip off any part of the mov-ing picture film used in the bright studight without running the film. It has a capacity of 100 feet of film with room for 1,600 pictures, and while the photographs are not moving pictures, they are taken in much the same manner, following one after another along the line of the film.

one after another along the line of the min and the control of the first the latter may be left on the mounting and is sufficiently adaptable to be used in any position. Every picture automatically registers on a timer and number, so that the operator always knows the exact number of pictures he has taken and the

time each snap was made.

Mr. Bass originally designed the device to be used in training machine gunners, the wonderful accuracy made possible by the "hits" registered being used very successfully by the French aerial machine gunners. With a number of changes it has now been perfected for commercial purposes and will be employed for surveys and general topographical work, for aerial police work as well as improving the marksmanship of llyers. An Aerial duel will be fought later in the week between operators in two seaplanes over the ocean. By the tining device connected up with the trigger it will be possible for the judges to discover which "gunner" "killed" the other first as well as reproducing pictures that will show the number of bull's-eyes made.

Mr. Bass also demonstrated a "moviette," a small, compact moving picture camera measuring eight inches long, five and one-half inches wide and three inches through. Many of the principles employed in the camera gun are used, but instead of a trigger a handle is used to flash the shutter, turned like that of the ordinary movie camera. This little camera, weighing but three and one-half pounds, was taken aloft over the Atlantic City Airport and its developed films were sharper in detail than any taken thus far from an aeroplane during the Pan-American Aeronautic Convention. Because of its light weight and small measurements, the operator had great free-dom of movement, and the demonstration won high praise from notable experts.

Sporting gunnery contests will be held with the camera gun later, the records of marksmanship being submitted to a competent board of judges. Every effort will be made to introduce this sport among the colleges as a means of creating a most valuable reserve of aerial expert gunners ready for any sort of an emergency.

Contest Winners

The Contest Committee of the Second Pan-American Aeroantic Congress in its report amounced the winners of the various contests staged in connection with the annual convention here throughout the month of May. Awards will be made on June 5th. The following results were given out:

maue on June 3th. Ine following results were given out:
Opening Day, Seaplane Race—E. K. Jaquith, Atlantic City
to New York; passenger, Harold Willets; time, I hour and
48 minutes; first prize, \$500; curtiss F-boat. B. H. Kendrick,
Atlantic City to Perth Amboy; passenger, E. L. Reed; time,
2 hours; second prize, \$250; curtiss F-boat.
Opening Day, Land Plane Race—Rohand Rohlf, Westbury,
L. to Atlantic City; passenger, Victor Hugo Barranco;
time, 2 hours and 8 minutes; first prize, \$500; Curtiss Oriole.
Edward Silvaso Gween, L. L. to Atlantic City; passenger,
Prize, \$250; Curtiss J. A. L. to Atlantic City; passenger,
Prize, \$250; Curtiss J. A. L. Shutrs and M. minutes; second
prize, \$250; Curtiss J. A. L. Shutrs and M. minutes; second
Intercollectable Sexabor Race, May M.—Domostalvanis & O.

Intercollegiate Seaplane Race, May 3d—Pennsylvania, S. R. Beckwith, first prize, \$250; Columbia, Eusign W. S. Martin, second prize, \$150; Yale, Ensign A. A. Beckwith, third prize, \$100; Amherst, Augustus Post, fourth prize, \$50.

Intercollegiate Land Plane Race, May 3d—Columbia, Lieutenant A. L. Smith, first prize, \$250; Yale, Ensign A. A. Beekwith, second prize, \$150; Columbia, Lieutenant G. S. Lemstrand, third prize, \$100. Intercollegiate Land Plane Race, May 24th—Princeton, Lieutenant Jack Frost, first prize, \$250; Pennsylvania, Lieu-tenant C. H. Payne, second prize, \$150; Columbia, Lieutenant Floyd Gahman, \$100; Yale, Envien A. A. Beckwith, \$50.

Boston Glole Trophy-Captain Mansell R. James, R. A. F., first prize, \$1,000; M. W. Hodgdon, Boston, second prize, \$500; Frank H. Stanton, Princeton, third prize, \$250.

Herald Efficiency Prizes-Captain Mansell R. James, R. A. F. first prize, \$1,000 (Class B, aeroplane with more than 100 horsepower); A. Livingstone Allen, second prize, \$250 (Class

A, under 100 horsepower).

Aerial Commuting—Greatest Total Distance During Month
—Frank H. Stanton, Princeton, 920 miles; Robert Shank,
Atlantic City, 796 miles; A. L. Allen, New York, 236 miles.

Greatest Number of Trips-Frank H. Stanton, Princeton,

6 trips; Robert Shank, Atlantic City, 5 trips; A. L. Allen, New York, 1 trip.

Longest Flights-Captain Mansell R. James, R. A. F., 340 iles: Frank H. Stanton, Princeton, 340 miles; A. L. Allen,

Longest Figury—capment manner in James, and miles; Frank II, Santon, Princeton, 340 miles; A. L. Allen, New York, 340 miles. Most—Where the same distance was covered the awards were based on the time. The prizes awarded were the Second Pan-American gold, silver and brone medials. Pulitrer Troply, Valmed at \$5,009—Captain M. R. James, R. A. F. Althattic City to Boxfor; clapsed time, 4 hours, one stop of 40 minutes at Mitchell Field, L. L.; run made May 20th. Parachute Contest—\$500 Bennett Prize—Lieutenant Jean randomic Contest—Seed defining the Trize—Leulenant Jean Ors, three trials, two by Werner Genet from 350 and 1,000 foot levels; W. L. Watkins, three trials, jumps by George Weiss, same altitudes; Lawrence Sperty, two trials, jumps by F. Godwin from 1,000 foot levels. Decision on winner deferred pending compilation of records.

Urge Adoption of Medical Standards

The adoption of International Medical Standards for the classification of those who want to fly was urged in a report rendered to the Second Pan-American Aeronautic Convention by the Special Committee on Air Medical Standards.

tion by the Special Committee on Air Accided Standards.

The report discloses the fact that recommendations were made for International Air Medical Standards two mouths ago by the Joint Committee on Air Medical Standards of the Pan-American Convention and sent to the Inter-Allied Aeronantic Commission in Paris, which is forming the rules and regulations to govern international aerial navigation,

regulations to govern international aerial mavigation.

The report presented points out that while a great majority of people can fly to heights of over 15,000 feet, there are a sufficient number of people who cannot fly to heights above 10,000 feet to make it necessary to classify flying

neights above 10,000 feet to make it necessary to ctassify flying appraints in accordance to the heights to which they can fly. The work of classifying people in accordance to the altitude level to which they can fly must be done by specialists who are the equivalent of the "flight surgeons" which were created in the U. S. Air Medical Service of the United States Army cighteen months ago, and save hundreds of lives of Army aviation students as well as aviators at the front.

The need of "flight surgoons" to deal with the medical

aspects of civilians as well as military aviators was emphasized in the report rendered by the committee. The report disclosed for the first time, how the Air Medical Service classified 30,000 Army aviators according to the heights to which they could ily, and how "flight surgeons" kept the aviators in good physical conditions throughout the war. The report urges the establishing of "flight surgeons" as a permanent body of experts to look after the civilian aviators, pointing out that the "flight surgeon" is entirely an American institution created in the beginning of 1918.

in the beginning of 1918.

The report gives credit for the good work performed to The report gives credit for the good work performed to Colone Language and Francis Colone Language and Francis Colone Language R. Lewis, Colone Language Colone Language R. Lewis, Colone Language Colone Language and Mr. Walter Camp. For this pioneer work General Lyster was awarded the Distinguished Service Medial.

Aeronautic Mapa

"The map of the future is the air mosaic," declared Lieutenant M. C. Lawrence, R.M.A., A.S.A., speaking before the convention. "Whether it be the military map, the automobile road map or a map of the air routes, the only absolutely accurate information of the terrain, the roads, the clevation accurate information of the towns, cities and all topographic features, is the minute mosaic—the map produced by dovetailing pictures snapped from the aeroplane of any given territory. The Government, from the aeroplane of any given territory. The Government, realizing the value of these records of the country, has already started to employ the aviators still in the training camps of the West in making of a map that is expected to cover every inch of territory in the United States.

"The making of this map is a stupendous undertaking and will probably require years of hard work and application, but its military and commercial value once it is completed will be

mlimited

"It has been said that the eye, the sextant, planes and all other mechanical measuring devices can be fooled, but the sensitive vision of the isochromatic plate cannot be fooled. Photography played a most important part in the war. The observer was easily misled by camouflage of the enemy, but fool the cyc of the camera. Gun emplacements most carefully concealed were readily revealed on the plates of the camera. Every slight change in the ground was depicted by the camera, and now the work of picturing every hit of this country has really been started by the Government, and

(Continued on page 650)



THE NEWS OF THE WEEK



\$25,000 Offered for New York-Paris Flight

A prize of \$25,000 has been offered by Raymond Orteig for the first non-stop aeroplane flight between New York and Paris, a distance of about 3,600 miles. That distance has never been flown by an aeroplane without stopping.

Mr. Orteig is proprietor of the Hotels Brevoort and Lafayette. He said today that he was led to take an interest in flying by talking with American and French airmen, who have visited him at

the Brevoort.

These men believe that the next five "These men believe that the next five years will bring great development in the aeroplane," said Mr. Orteig. "It was their enthusiasm that converted me. Then I was seized with the idea of combining sport with the art of flying. I was born in France, you see, and I have lived in this country since 1882. So I decided that a New York-Paris flight would be a big thing both council the future of avisition. thing, both toward the future of aviation and to further unite the two great na-

'My only stipulation was that the airmen making the flight must be of allied nationality. The other details will be an-nounced as soon as I have them. The Aero Club of American is preparing a set of rules for my approval concerning the conditions under which the flight must be The start may be made from either side.

U. S. to Get 1,600 Foreign Planes Washington, D. C., May 30.—One thousand Nieuport and 600 Spad aeroplanes, and 1,000 Hispano-Suiza and 800 Gnome motors will be shipped to the United States under the terms of an agreement between the French Government and the United States Liquidation Commission.

The planes and motors represent a part of the aviation equipment contracts for abroad by the War Department.

Recommendation to Abandon Naval Pro-gram Not to Apply to Aircraft

Washington, D. C.—Although Secre-tary of the Navy Daniels has recom-mended the abandonment of the naval mended the abandonment of the naval three-year building program in order to demonstrate confidence in the League of \$45,000,000 appropriation for avaision. "If this appropriation is made," he said, "we intend to spend very little in stations. The chitre amount, so far as practicalle, more planes for our ships to be used in flect manoeuvres. They are absolutely necessary to effective manoeuvres.

St. Petersburg to Havana in 5 Hours 20 Minutes

Havana, Cuba.-Flying a Curtiss riavana, Cuoa.—Fiying a Curtiss F boat, Johnny Green made a flight from St. Petersburg, Fla., to Havana, Cuba, a distance of 381 miles, in 5 hours and 20 minutes, averaging over 70 miles an hour. This is the first commercial flight between Cuba and America.

First Woman Makes Air Journey From Washington

The first woman to make the air jour-ney from Washington to New York, the Army Air Service announced, is Mrs. E. E. Harmon, wife of an army lieutenant, who left Washington at 11.10 A. M. to-

day and arrived at Hazelhurst Field two hours and forty-five minutes later. Her husland piloted the machine, a military bombing plane, and Colonel Robert E O'Brien, Colonel William C. Sherman and Major Raycroft Walsh were other pas-

Cuba Thanks U. S. Air Service for Instructors

Washington, D. C., June 2.—A letter was received from the Cuban Minister through the Office of the Secretary of State by the Office of the Secretary of War which expresses the appreciation of Cuba of Kelly Field and School of Military Aeronautics, Austin, Tex., for the efficiency, devotion and the interest manifested by the corns of instructors of the entency, devotion and the interest manifested by the corps of instructors of the School of Military Aeronautics of Austin, Tex., and of the United States Aviation School, Kelly Field, San Antonio, in the School, Kelly Field, San Antonio, in the training of the group of aviators and ma-chinists of the Aviation Corps of the Cuban Army, who were sent to those schools for their instruction.

To Preach From Pulpit 2,000 Feet Up in Air

The first sermon from the air, preached a "sky pilot" of the Methodist Church, will be a headliner at the Methodist Cen-tenary Exposition, to be held at Colum-bus, Ohio, June 20 to July 14, according to plans announced.

According to the exposition's press agent the aerial sermon will be preached by a minister who will float above the heads of his congregation at a height of 2,000 feet or so. His message will be audible to all by means of a wireless telephone and a megaphone attachment.

Aerial Police Patrol Proposed for Detroit Detroit, Mich.-Control of air traffic in

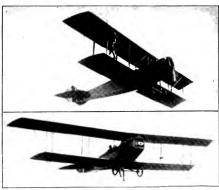
Detroit, Mich.—Control of air trame in Derroit by a flying patrol is classed by the police commissioner as not only a possibility but a probability. The com-missioner expressed himself strongly in favor of an anxiliary to the police de-partment for aerial work and an effort will be made at once to interest prominent Detroiters in the matter of purchasing aeroplanes for the police department.

Aero Club of Columbia Will Purchase Landing Field New York, N. Y.—Lieut. E. L. Smith, president of the Aero Club of Columbia, announced that the organization will soon be flying its own planes on its own field in the near future. Contributions for the purchase of planes and gifts of equipment have been generously given. A. Monell, have been generously given. A. Monell, director of the International Nickel Corporation, and J. P. Grace of W. R. Grace, with contributions of \$1,000 and \$500, respectively, being among the recent donors. The club has 24 flying members, some of whom have seen service overseas. spicuous among these are George De Forrest Larner, American ace; Lieut. M. D. Lowenstein, who was attached to the 49th Bombing Squadron, and Lieut. A. K. Doo-

Dean George B. Pegram said recently that he is looking forward to the time when courses in aeronautics will be established as part of the curriculum of the School of Engineering.

End 3,300-Mile Flight From Texas to Pacific

Washington, May 27.—The War De-partment was notified to-day that the El-lington Field "Gulf-to-Pacific" squadron



Lieut. Ormer Locklear, the Aerial Acrobat, Performing for the Benefit of the Crowds at Atlantic City's Airport

of Dellaviland Four planes has just returned home after a remarkable cross-country flight of 3,300 miles from Texas to the Pacific Coast and return.

This squadron, under command of First Lieut. R. O. Searle, charted unknown ter-ritory, skimmed the waters of the Gulf of Mexico, darted over the backbone of the continent at a height of 16,000 feet, tasted salt water at San Diego, and has even flown 600 feet underground.

Accompanying Lieut, Searle on the flight were Lieuts, E. D. Jones, Rick Nelson, Charles Rugh, Howard Birkett and E. L. Bilheimer, Sergeant W. E. Cain and Louis Lewyn, a motion picture photog-

rapher. The actual flying time for the 3,300 miles traversed was 1,940 minutes. This is an average speed of about 101 miles an

Remarkable spurts of speed were made at times. On the way from Kingman, Ariz., to Tucson, Ariz., flying at an alti-tude of 14,000 feet, Lieuts. Ecarle and Jones passed over l'hoenix, Ariz., which is 167 miles distant from Kingman, in exactly one hour after they had left the latter place.
The trip from San Diego to Los Ange-

les, a distance of 134 miles, was accomplished in fifty-six minutes, an average speed of about 140 miles an hour.

speed of about 140 miles an hour. Licuts, Searle and Jones made the first trip ever attempted across the Grand Canyon in an aeroplane. They crossed the big chasm at the junction of Diamond Creek and the Colorado River Canon, which, at this point, is about 2,000 feet aeross, with a sheer drop of 7,000 feet. aeross, with a sheer drop or 7,000 feet. They flew at an altitude of 13,000 feet, and were bothered by terrific bimps and cross currents of air. The ship was knocked around and buffeted so that it

was hard to control it.

Lieut, Rugh and Lewyn, the motionpicture man, actually flew down into the canyon. They got down to 600 feet below the edge of the canyon.

First Flight Into Yosemite Valley Made

Yosemite, Cal., May 27.—The first aero-plane flight into Yosemite Valley was ac-complished on May 27 by First Lieutenant lames Stephen Krull, flight com-

mander at Mather Field, flying from Merced, Cal.

Rising to an altitude of 11,000 feet, Lieutenant Krull completed the eighty-mile flight into the heart of the Sierra Nevada Mountains in one hour and five minutes.

Oil Companies Use Aeroplanes to Deliver Pay Rolls

Several Texas oil companies have Several lexas oil companies nave adopted aerial delivery for their pay-rolls, the increase of speed and the safety from possibility of hold-up being among the considerations that led to the adoption of aeroplane delivery.

Bernard H. Baker, Mayor of South St. Paul, Minn., reports the successful use of an aeroplane in campaigning for office. A Brooklyn physician has purchased an aeroplane to use in flying from his home to Lake George, where his summer bungalow is located,

Sioux City to Establish Landing Field Sioux City, Ia,-The Sioux City Cham-ber of Commerce and the local Press Club are conducting a campaign for the estab-lishment of a local landing field.

Impetus to the movement was given by a visit of Captain Eddie Rickenbacker and a visit of Captain Eddie Rekenbacker and an elaborate banquet tendered by the Press Club of Sionx City. It was at Sioux City Speedway that Captain Rick-enbacker in 1914 won his greatest dirt track race.

Underground Dirigible Hangar to Reduce Construction Expense As a solution of the difficulty of con-

structing dirigible hangars suitable for housing eight or more dirigibles and permitting launching under the most favormitting launching under the most tavor-able conditions regardless of wind direc-tion, a writer in a German publication suggests the use of a large circular trench. A light metal roof having doors is to be operated by a motor so that any airship, particularly the one most favor-alily located as to wind direction, may be launched. The cost of construction of launched. The cost of construction of a hangar system of this type is said to be lower than for buildings where the high strength required on account of wind, coupled with difficulties of launching encountered in adverse winds are serious disadvantages

Admiral Peary, Explorer and the President of Aerial League of America, Elected to Board of Managers, Washington, Leaves and Pearl Sector Washington, Pearly, U.S. N., retired, Artic explorer and discoverer of the North Pole, president Aerial League of America and member of the Board of Governors of the Aero Club of America and Sector 1 of the Roard of the Aero Club of America. was elected to be a member of the Board of Managers of the National Geographic Society to succeed the late Brig, General John M. Wilson, U. S. A., who died recently.

San Francisco-Los Angeles Passenger Service Planned

San Francisco, Cal., May 28.-Plans for he development of aero routes on the Pacific Coast were given out by the Pacific Aero Club at its annual meeting in this city, these plans including a cross-conti-nent flight from San Francisco to New York, and a mail and passenger route be-tween San Francisco and Los Angeles.

A private company is just completing A private company is just compressing plans for the aero passenger service be-tween San Francisco and Los Angeles, according to Frederick Porter, first vice-president of the Pacific Aero Club, and assurances have been given that the government will co-operate with the private undertaking in establishing an air mail service between these two points.

The types of planes to be used in the mail and passenger service will be the Glein-Martin hombers, equipped with two 400-horsepower Liberty motors, which will carry 10 passengers, and Handley Page machines which carry 20 passengers. Passengers' compartments on these machines will be completely inclosed. Landing stations for this service have already been purchased or leased at Stockton, Fresno, and Bakersfield, by the Pacific Aero Club.

Aviation Will Be Discussed at Commercial Conference

Washington, May 31,-Aviation as an aid to Pan-American commerce will be one of the features on the program of the Second Par.-American Commercial Con-ference to be held here June 3 to 6. The possibility of this latest method of transportation in the development of trade be-tween the United States and Latin America, is one of the topics whih will be discussed by the commercial experts who will be present at the gathering. who will be present at the gathering. Plans are being considered for a special exhibition flight over the Washington Monument grounds adjoining the Pan-Americant Building for the benefit of the conference on the day aviation transportation is under discussion. Shipping and transportation, financing trade and the future of Latin American investments, loans and honds, trading methods for exports and imports, parcel post, patents and trade marks, trade and travel regulations, engineering, educational aids to commerce, these and other phases of comcommerce, these and other phases of com-mercial intercourse will be taken up by experts in the various lines. Telegrams have been sent by Director General Bar-rett of the Pan-American Union to the Governors requesting them to send rep-resentatives who will report back to the business interests of the States on the possibilities of future trade relations with Latin America. The United States and Latin America. The United States and every other republic of North and South America will be represented at the conference.



Capt. J. Alcock, D. S. C. (in civilian attire), the pilot of the Vickers-Vimy Biplane, which will soon attempt the Trans-Atlentic fileht, and Lieut, Arthur Whitten Brawn, who will act as navigator

DEPARTMENT STORE INAUGURATES **AEROPLANE** DELIVERY SERVICE

OES Newark know how? Apparently it does. The first regular aerial "store to

The first regular aerial "store to customer" delivery service in the country was inaugurated May 25 between 1. S. Plaut & Co. and Asbury Park.

The plane, specially designed and constructed by the Witteman-Lewis Aircraft Co., which was piloted by Lieutenant Paul Micelli, who was accompanied by Lieu-tenant Louis Goldberg, both of whom had formerly been in the United States Army Serice as pilots and instructors, made the flight between Newark and Asbury Park in approximately 25 minutes, flying time. Starting from the aviation field on Lin-

coln Highway, the plane first flew over the central part of Newark, making sev-eral manœuvres over and around Plaut's, very much to the admiration of thousands of spectators who crowded the streets below. The plane then set a straight course for Asbury and in spite of the rain-storm that had set in and low hanging clouds trat nau set in and low hanging clouds which obscured the pilot's vision, made a wonderful trip to Asbury, landing on the aviation field there in perfect order. Plaut's auto trucks were awaiting the arrival of the plane and within a few minntes the merchandise was transferred to the trucks and the mail bag was deliv-ered to the Asbury Park Post Office



within six minutes of the plane's arrival, The plane carried in addition to its customers' parcels, a mail bag and the two pilots. The pilots were sworn in at the Newark Post Office as postal messengers so as to give them legal status to carry the mail from Newark to Asbury. This is the first time in history that a commercial organization was authorized commercial organization was authorized by the Post Office Department to carry mail, which is an unusual honor ard compliment paid to the Plaut Co., and evidence of the great interest taken by the Government in aeronantical develop-

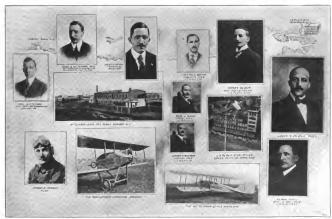
A letter from Mayor Gillen to Mayor Clarence E. F. Hettrick of Asbury Park, carried in the mail bag, follows: The aviator who will deliver this letter to you will bring you greetings from the people of Newark.

As I understand it, for the first time in the history of the world an aerial delivery service for the transportation of merchandise is established. The aeroplane which carries our greetings to you will hereafter transport daily merchandise for the progressive and enterprising husiness house of L. S. Plaut & Co. of this city, between Newark and Asbury Park.

This is a remarkable advancement in aerial navigation. Our respective municipalities are to be congratulated for taking such a foremost position in the field of

such a foremost position in the field of progress.

Mr. Chester A. Brown, advertising manager of the L. S. Plaut Company, with Julius M. Meirick, a promoter of commercial aviation, had full charge of arrangements for the flight. They will announce a regular schedule in the near future, Mr. Meirick declared.



Personnel of L. S. Plaut & Co., and Wittemann-Lewis Aircraft Co., who co-operated in establishing the first store-to-customer department store agrical delivery



THE TRANS-ATLANTIC FLIGHT SUCCESSFULLY COMPLETED

W. HEN Lientenant-Commonder Read brought hought the American seaghant NC-4 to her anchorage in Lislon harbor he had achieved the triumph every flying man of every nation had dreamed of—passage telewen the New World and opplanned such a trip in their mighty Zeppenins, Hawker and Grieve had bodly challenged the perils of an unescorted dash; Ferech aviators had laid their planned or the state of the control of the state of the control of the state of the way over mechanical difficulties, the elements worth empirical difficulties, the elements conferr to adhesion of the human organism conferr of the state of the state of the human organism conferr of the human organism conferr of the state of the human organism conferr of the state of th

But theirs was no adventure of sportsmanship. They were under orders in the uaval service of their country, and their goal was not merely the coast of Europe. They were instructed to fly by a definite route to a particular objective. Had they not reached that objective their trip would destination of the seaplane flight. But no other spot could have been more appropriahave been unsuccessful from the official point of view. Consequently their labors did not cease until their craft came to rest in the English harbor of Plymouth.

did not cease until their craft came to rest in the English harbor of Plymouth. the ordering of its eruises, practical reasons dictated the selection of Plymouth as the ate for the ultimate landing place of a pioneer transatlantic airship sailing from the United States. From Plymouth the Mayllower Plygrims departed September World, to found "a church without a hishop, a state without a king."

The conquering of the air in the flight over the Atlantic was only one of the problems the Navy set out to solve when it began the experiments that brought it began the experiments that brought produced by Germany's submarine war andae it destrable that a new method of combating U-looats should be devised, for saval authorities fooked to the development of the aerospane to provide to the development of combating U-looats should be devised, example of crossing the occasin in the air.

of alighting on the water and making progress as a baot, of rising from the sea. The performances of the three seaplanes are the progression of th

art of flying.

Mastery of the air will belong to America if the United States will exert itself to hold and maintain it. The new profession of flying is American by virtue of the discoveries and application of scientific principles made in this country.



The NC-4 the first aircraft to successfully cross the Atlantic



Crew of the successful NC-4, from left to right: Lieut. Commander A. C. Read, commander; Lieut. E. F. Stone, pilot; Lieut () g) Walter Hinton, pilot; Eosign Redd, redio operator; Chies Special Mechonic E. H, Howard, engineer; Lieut. J. L. Breese, reserve pilot eegloeer

Our leadership was lost to us by our own lethargy and indifference. Read and his fellows, the opportunity having been given to them by an awakened officialdom, have restored it to us.

restored it to us.
The last "hop" of the American Navy's ocean-spanning plane, the NC-4, was commander Albert Cushing Read five homander Albert Cushing Read five the mouth, England, This last leg of the long-dreamed-of transstantic flight was from Ferrol, Spain, and was accomplished without untoward incident, the flight requiring just one minute less than secon

Secretary Daniels announced that no intriber instructions had been sent as to the movements of Commander Read and his crew. The question as to whether the historic plane will be flown back to the United States by a more, direct route or Chined States by a more, direct route or decided by circumstance. The flight across was planned on the known fact that except for about four days a year the wind would be in the direction of the flight and the engines of the hig plane were designed for security hours contintery have been subjected since this one successful unit of the fleet of there flying loats left Rockaway and the fact that a head wind of at least ten miles an bour would have to be fought against all the way back, will make it necessary to ship the flying boat back to the United States. Daniels sent the following message to the

"All the people of America are happy over your successful flight, which has been an epoch making event in the history of the world. My congratulations and greetings and good wishes."

Receipt also was announced of the following message through Rear Admiral Knapp from the British Admiralty: "This morning's news brings the epoch making intelligence that the space between

"This morning's news brings the epoch making intelligence that the space between America and Europe has now been successfully spanned by air by way of the Azores. It is with great pleasure that their lordships have heard of this success and they desire me to offer their congratulations to the crew of the scaplane NC-4 and to the United States Naval Air Service on the fine achievement.

vice on the fine achievement."

The loop to England from Portugal came read, \$14 Mills and \$10 Mills



Crew of the N.C.1 from left to right; Lisuiseant-Cammander, P. N. L. Bellinger, commander, Lieut.-Commander M. A. Mitscher, pilot; Lieut J. T. Barin, pilot; Lieut (j. g.) Harry Sedmwattr, radio operator; Chief Machinist's Mate, C. I. Kessler, egineer; Machinist Raamus Christians, and the comment of the co

Immediately upon receipt of the news of Kead's successful landing Secretary



The crew of the NC-3 from left to right: Lieut-Commander John H. Towers, commander Lieut-Commander H. C. Richardson, pilot, Lieut. David McCullough, pilot; Lieut-Commander H. A. Lavender, radio operator; Machinist, L. R. Moore, engineer; Lieut. (j. g.) Braxton Rhodes,

In this last leap in the long flight the troubles which have followed Read and the NC-4 since the beginning of the flight cropped up again. He was forced to bring his plane down twice, the last time at Ferrol. Spain, in order to complete the scheduled try to Plymouth.

From first to last the NC-4 has been taken 4.514 miles—ordinary land miles—or 3.923 knots or nautical miles, on the following schedule:

Schedule of NC-4's Eventful Flight

Dendant				,
	From Rock	away		
		Distance.		Speed,
Course.	Date.	Knots.	Time.	Knots.
Rockaway-Cha (forced ta- shout 100	nding			
off Chathar	n) May 8	300	5:45	5.2
Chatham-Halif	ax . May 14	320	3:51	85
Halifax Trepar	ney May 15	460	6:20	72.6
Trepassey-Hor	ta . May 16-1	7 1,200	15:18	78.4
Horta-Ponta	Del-			
gado	May 20	150	1:45	86.7
Ponta Delgad	D.			
Lisbon	May 27	800	9:44	82.1
Lisbon - Mond	ego.			
River	May 30	100	2:07	48.8
Mondego Rive	e.		=.47	40.0
Ferrol	Man 10	220	4:37	45.6
Ferrol-Plymou	1 May 30	455	6:59	
				64.8



The NC-4 arriving at the Asores, efter successfully flying the longest apen of the Trans-Atlantic journey

Commander Read.

The flight across the Atlantic from Newfoundland to Lisbon, a distance of 2,150 nantical or 2,472 land miles, was made by the NC-4 at the rate of 80 knots, or 92 miles per hour. This is far in excess of the cruising speed of 63 knots, announced at the start of the flight.

When the NC-4 reached Plymouth, her destination, she had traveled a distance of 3,925 nautical, or 4,514 land miles. Commander A. C. Read belongs to the

Commander A. C. Read belongs to the second group, in point of time, in the development of Annapolis graduates in aviation. To the first group belonged Towers, Richardson, and Bellinger. The Towers, Richardson, and Hellinger. The pioners became pilots through individual training. Read is a member of the first aviation class of the navy, that of 1914. He had been graduated at the Naval and his ability advanced him rapidly in aviation. He not only won a place as one of the best pilots, but also as an administrator in the aviation division. Commander Read was born in New Hampshire in 1857, and appointed and Islampshire in 1857, and appointed and is married and has one child, a bow. He

is married and has one child, a boy. He is a small man, quiet and observing.



There is perhaps no naval aviation offi-

He has devoted his time to it since 1915, and in these four

eer who has put more conscientious study and effort into flying than has Lieutenant

Lieut.-Commender A. C. Read, who will go down in history as the first air pilot to suc-ceasfully trens-navigete the Atlantic

Admiral D. W. Taylor whose enthusiasm was largely responsible for the Trans-Allantic flight of the U. S. Nevy flying boats

years has proved his worth as a pilot and

as an administrator.

His first sea service after he was graduated was on board the battle ships Massachusetts, Indiana and Arkansas. In November, 1908, he was ordered to report for duty to the commander of the Third Squadron, Pacific fleet, and was assigned to duty on board the destroyer Decatur. He was ordered home in August, 1911, and left Nagasaki harbor on September 11. Two days later he was promoted to the rank of lieutenant, junior grade. He was made a lieutenant, senior grade, on July 1, 1913.

After he reached home he was assigned to duty at the torpedo station at Newsacola to study flying. He remained there a year and then was ordered to duty aboard the cruiser North Carolina and later to the Washington. On June 5, 1917, he was detached from sea duty and sent to the aviation station at Bay Shore, L. L. of which he became commander.

Lieutenant Commander Read has a wife

and child. He married Miss Bessie Bur-

and child. He married Miss Bessie Burdine, of Miami, Fla., on January 31, 1918.

First Lieutenant Elmer F. Stone, pilot and constructor, helongs to the United States Coast Guard, and is one of the oldest filers in that organization. His oldest fliers in that organization. His skill and daring when the war placed a greater pressure on the Navy led to his transfer to the Bureau of Construction and Repair as a test pilot for new ma-chines, and the record he made won him a place in the transatlantic list. Lieuten-ant Stone was born in New York in 1887, and appointed to the United States Coast Guard Academy from Norfolk, Va., from

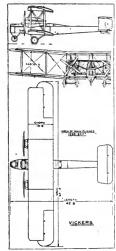
which he was graduated in 1910.

Lieutenant Walter Hinton, pilot, was an enlisted man who became an ensign in March, 1918, and on account of his skill March, 1918, and on account of his skill as an aviator was designated as one of the pilots of the flying boat H-16 in its flight from Rockaway Beach to Hampton Roads last January. Hinton was born in

Roads last January. Hinton was born in Ohio and is 31 years old. Ensign Herbert C. Rodd, radio office for No. 4, assisted in the development of the radio compass used on the three sea-planes. Before he joined the United States Naval reserves in August, 1918. Ensign Rodd served as radio operator on the Great Lakes. He was born in Cleve-land, Ohio, in 1894.



Commonder C. G. Westervelt, who had charge



ers played a very important part in the great experiment. It has been possible, by their means, to test the value of a number of different kinds of wireless equipment, and many useful results will be gathered from their experience.

The Vickers Entry

The Vickers craft is being assembled at St. John's on the field at Mount Pearl, where Hawker and Grieve took off. carries two standard Rolls-Royce engines of 350 horsepower each. The gasolene of 350 horsepower each. The gasolene tanks have been increased to make a capacity of 865 gallons. This, in the opinion of Captain J. Akock, her pilot, will permit the Vickers-Vimy to fly 2,440 miles without alighting. While the maximum speed is more than 100 miles an hour the engines have been throttled down to an average speed of ninety miles for the overseas flight.

The wing span of the Vickers-Vimy is only 67 feet from tip to tip. Nevertheless it is a sturdy craft, huge in construction. Its body is 42 feet 8 inches in length. The wings are 10 feet 6 inches in width.

A wireless set is being installed as part of the finding apparatus. Its range both for receiving and sending is about 250

Captain Alcock, the pilot, was born in-Manchester in 1892 and received his tech-nical training at the Empress Motor Works in Manchester, He became interested in aviation in its early days, and has

and later was chief instructor of Britain's "acrobatic squadron." As commander of "acrobatic squadron." As commander of a bombing squadron in long-distance raids over Turkey he won the Distinguished Service Order.

One night he was compelled to land on

enemy soil owing to engine trouble, and was taken prisoner by the Turks. He remained a prisoner until the end of the war.

Lieut. Arthur W. Brown, navigator of Lieut. Arthur W. Brown, navigator of the Vickers craft, was born in Glasgow in 1886. His parents were Americans. He received his technical training with the British Westinghouse Company, and due to his expert knowledge of surveying became a specialist in aerial navigation.

He served with the Second Battalion of the Manchester Regiment in France in the early days of the war and later became

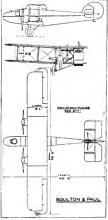
been a pilot since 1912. In the famous being slightly changed, however. Her London to Manchester race in 1913 be gas capacity will be about 2,506 gallons. He became an instructor in the Naval 22 hours without stopping. This would Flying Corps at the outbreak of the war, give her approximately three hours' lee-and later was chief instructor of Birtain's way in making the Jishi coast, with ordinated the control of the single properties of the single properties of the single properties. nary weather conditions and no adverse winds.

The transatlantic crew will consist of The transatiantic crew will consist of four men, pilot, navigator, wireless operator and observation officer. The pilot will be Major H. G. Brackley, D. S. O., D. S. C. He is 24 years old, and when the war broke out was a student just beginning the journalistic course maintained by Reuters, the great English maintained by Keulers, the great Engissin news syndicate. He volunteered for the war and received his pilot's certificate in 1915. He had his first offying in the Shortt machine, and participated in the first night bombing of Bruges and Zee-brugge. He received his Distinguished Service Order for his services in these raids.

His first command was the Seventh Naval Squadron; he was later assigned to the Fourteenth Army Squadron, and later when the Royal Air Force was organized he was made a squadron commander. Under him he had many Americans, some of them pilots.

His navigator will be Major Tryggve Gran, a Norwegian, 30 years old. While a lieutenant in the Norwegian army he flew from Cruden Bay, Aberdeenshire, to Norway, carrying a copy of the "Daily Mail" to Queen Maud. He was the first pilot to complete successfully the North Sea flight. He served as a ski expert with

(Continued on page 650)



an observer in the Royal Flying Corps, He was also taken prisoner over the western front in 1915, and remained in-terned in Switzerland until the end of the war.

The Handley Page Entry

Like the Vickers machine, the Handley Page bomber was intended for bombing Berlin. She could then carry 1,190 gallons of gasolene, a 200 pound wireless set, 6,640 pounds of bombs, twelve machine guns weighing 557 pounds and a crew of seven men.

She made 90 miles an hour on her test flight with this load. The machine is







veready DAYLO in its Kit





Every Daylo is equipped with the long-lived, bright burning Eveready Tungsten Battery and Eveready Mazda bulb. The Tungsten Battery in this Daylo burns from 8 to 12 hours continuously.

For food they took a chance with the scantiest of rations. But they took no chances with their light— ALL THE NC 'PLANES CARRIED DAYLO

-the big, husky Searchlight Daylo that says, "There it is!"

THE RADIO TELEPHONE EQUIPMENT OF THE NC-4

By EDGAR H. FELIX, A., I.R.E.

HE radio telephone transmitting set used on the NC-1, NC-J and NC-4 is known by the type number S.E. 1,100, the letters S.E. indicating it to be a design of the Bureau of Steam Engineering of the Navy Department. This equip-ment is also standard on the HS-16 flying boats. The develop-ment of this advanced transmitter is the work of the Marconi Wireless Telegraph Company of America.



Fig. 1-Front view of the SE 1100 transmitter, showing control switches and rheostats

In preliminary tests off Hampton Roads, this set has transmitted speech over a distance of 150 miles from a seaplane in flight, using a 600-foot trailing antenna radiating a maximum antenna current of 2.5 amperes. In addition to the trailing antenna, the NC boats are also equipped with fixed emergency

antennae, stretched above the main planes, to permit trans-mission while taxying or floating on the surface of the water. The design of the set permits of transmission of three

types: (1) Voice currents. undamped waves. (2) Continuous or undamped waves. (2) Continuous or undamped waves. (2) Continuous or undamped waves. Two wave lengths are used, 1,000 meters being radiated when a trailing antenna 000 feet in length, having a capacity of ,0004 microfarads is employed; the other of 600 meters being obtained with the fixed emergency antenna, having a capacity of 20020 microfarads.

Two large pliotron tubes, requiring a filament potential of 18 volts and a plate potential of J,100 volts are used. One tube is a modulator, which imposes the variations of the voice on the output of the second tube, the oscillator.

The Transmitting Circuit

Following the simplified circuit of the set in Figure 2, we

Following the simplified circuit of the set in Figure 2, we find that the modulating circuit consists of the microphone M, 5-voil battery B and telephone induction coil primary, the control of the cont

to the plate and the negative side of the filament of the oscilto me paite and the negative side of the biament of the oscil-lator tube, by means of audio frequency transformer L3. The plates of both tubes are maintained at a potential of L100 volts with respect to the filaments by means of 1,500-volt generator G. The choice coil 1.a prevents the radio frequency currents developed by the oscillator tube from flowing back through the generator. Protective condenser G is connected across the brusiles of the generator.

across the brushes of the generator.

In order that a tube may generate continuous waves, it is
lin order that a tube may generate continuous waves, it is
the state of the generate of the circuits, either induced the continuous conditions of the generate of the circuits of the circuits

In this set, the coupling between the grid and plate circuit in this set, the coupling between the grid and plate circuit is obtained inductively through coils L, and La. The plate circuit consists of plate P, protective condenser C, wave length change switch, condenser C, which is connected to the negative side of the oscillator filament. The grid circuit consists of grid G, grid condenser C, shunted by grid leak R, the sists of grid U, grid condenser U, shunted by grid leak K, the grid, by this means being maintained at a negative potential. From the grid condenser, the circuit continues through the wave length changing switch, inductance Ls and then to the negative side of the filament through condenser C. When it is desired to emit continuous waves, contact K₄ is

which it is destricted to finit continuous waves, contact Λ₁ is closed, thus making the circuit regenerative.

The antenna and ground connection is taken off coil L₁, the radiated output being measured by ammeter Λ₂. Condenser C₂ compensates in the grid circuit for the capacity in the plate circuit due to the antenna and ground.

Operation of Set

Figure 4 shows in greater detail the circuits employed and the arrangement of switches for operation. In order to simplify the diagram, the three main control switches, which may be seen across the center of operating panel in Figure 1, diagram being combined in one switch unit.

There are three positions for the signal switch at the left of the panel. In the first position, continuous waves are emitted. In this position the connections made in the second and third positions are opened. The second position is for telephony; the inside portion of the switch (the upper part in the figure), connects the microphone to the battery, and the

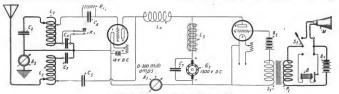


Fig. 2-Simplified diagram of wiring used on SE 1100

outside portion (in the lower part of the figure), completes the filament circuit for the modulating valve and short circuits contact Ki. In the third position of the switches, damped waves are obtained, the huzzer being substituted for the microphone in the connections.

The center switch changes the antenna connections and provides for the two wave lengths, 600 and 1,600 meters. The antenna switch, at the right of the panel, changes the

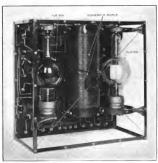


Fig. 3-Rear view of the wireless telephone transmitter showing method of mounting bulbs

set from sending to receiving. At the send position, it completes the 1,100-D.C, supply to the plates of both tubes, and also the connections to the microphone and buzzer.

also the connections to the microphone and buzzer.

A direct-current anmeter, A, is connected in S both of them. The instrument's scale registers from zero to 10 amperes; to read the current in either filament it is merely necessary to cut out to other one. This may be done by filament' and the serious description of the serious description of the serious description. The principal indication for checking up the proper operating conditions of the sgt is the plate current drawn by each

of the tubes from the dynamotor, which is obtained from plate

of the tubes from the dynamotor, which is obtained from plate current ammeter A₁, reading from zero to 300 milliamperes. Three rheostats, mounted on the lower portion of the operating panel control, respectively, the temperature of the oscillator tube filament, the potential of the grid of the modulator tube, and the temperature of the modulator tube.

Constructional Details

The entire set is wired with No. 12 B. & S. gage soft copper The entire set is wired with No. 12 B. & S. gage soft copper wire with empire cloth tubing slipped over it as insulation. No terminal lugs are used; the ends of the wires being in the shape of an eye, which fits the stud terminals and is passed around it in a direction that tends to make the wire grip the

stud when the nut is tightened.

The wiring has been so located that small or disturbing

The wiring has been so located that small or disturbing capacities between wires are avoided, according to the caution has been taken to prevent the fastenings working loose. Special steel lock washers are used throughout the set. The general scheme of construction is such that the main supports and fastenings will hend before they break,

wood or any material which splits or fractures having been eliminated. The steel wire cross braces shown in the illustration make the structure an extremely light and surprisingly

tration make the structure an extractive type and present the property of the primary source of energy is two 12-volt, 50-ampere hour batteries. The filaments of the two piotrons are operated through a rhoosta. The 1,500-volt D.C. generator for the plate potential is driven by the 24-volt battery. Three small batteries are required, one for the microplione, another for the negative grid potential and the third for the receiving equipment.

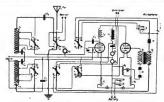


Fig. 4—Diagram showing the arrangement and wiring of the control

The Support of the Pliotrons

To insure against breakage, the best position for the plio-trous is vertical, with the large neck at the bottom. This brings the plate terminal cap at the top and the filament and grid terminal cap at the bottom. In each of the two dilecto rings shown at the top of the photograph, three spiral springs placed 120 degrees apart support a spring cap which fits over the plate terminal cap of the pliotrons. The springs are held by small machine screws which pass through the insulating ring. One of these serves as a terminal, being connected by a pig-tail to the spring tap. In each of the two bottom diecto rings, three spiral springs, placed 120 degrees apart support a special jack block made to take the filament and grid terminals. This block is made in two halves, upper and lower, held together by screws; clamping these spring jacks between them, three posts, which project from the bottom of the jack block, take the ends of the three supporting springs, and are that hold the other end of the spring to the dilector ring. The two filament terminals of the tube and the grid terminal are brought out to the three screws in the dilecto ring. Thus, each pliotron is supported to the rigid frame of the set by 6 springs which are set so that when the tube is in place the top springs

pull down and the bottom springs pull up.

The mechanical period of vibration of the vacuum tubes in this spring mounting is considerably below that of any vibration that will occur in the seaplane itself. Sudden shocks in any but a horizontal direction are not transmitted through these springs with sufficient violence to injure the tubes.

(Continued on Page 652)



Fig. 5—Rear view with bulbs removed to show the excellent switch construction

THE PROPERTIES OF BALSA WOOD

By R. C. CARPENTER, M. Am. Soc. C. E.

B ALSA wood grows extensively in the Central American And northern South American States as a second-growth tree. It is the lightest wood known, so far as any evidence attainable is concerned. This paper shows the microscopical structure and also gives various tests of its transverse and compressive strength. The material is composed of very thin-wallde cells, which are barrel-shaped, interlace with each other, and are almost devoid of woody fiber. These cells are filled with air, making a natural structure well adapted to prevent the transmission of heat, because of the particles of air imprisoned in the material without interconnecting fibers.

Balsa wood has been used quite extensively in the past as a buoyancy product for life preservers and in connection with the fenders of life-boats and rafts. Its life is short, under ordinary conditions, unless treated with antiseptic or preservaordinary conditions, unless freated with antiseptic or preserva-tive material. There is promise that it will have a field of usefulness, in the lines referred to, which must make it of considerable interest to the engineer who requires either in-sulating material or buoyancy products. It is also used for streamlining on aeroplanes in places where strength is not of

prime importance.

Very little information is available respecting the wood of the balsa tree. The wood which grows in the Isthmus of Panama is remarkable: first, as to its lightness; second, as to its microscopical structure; third, as to the absence of to its microscopical structure; third, as to the absence of woody fiber; fourth, as to its elastic character, in the sense of recovery from transverse deformation; and fifty, for its insulation qualities for heat. It is the lightest wood commercially useful, so far as the writer has been able to ascertain, and it has considerable structural strength, which makes it suitable for a fairly extensive use.

The Weight of Balsa Wood

Balsa wood, when thoroughly dried, has a specific gravity of 0.11. For reference, Table 1 shows the relative weights of various woods. Until recently, Missouri cork wood, weighof various woods. Until recently, Missouri cork wood, weighting [8.1] b. per cit. It, was supposed to be the lighest, but in [8.1] b. per cit. It. The ordinary commercial balas wood is seldon perfectly dry, and, because of the moisture content, its weight, as appears from a number of investigations made by the writer, will usually be between

TABLE 1 .- WEIGHTS OF WOODS

Common name.	Scientifir name.	Weight, is pound per cubic foot.
Dales	Ordrome legrans	
Cork		10.7
Missouri cork wood		10.1
White pipe,		
Cotalin		10.2
Cyprost	Phredium diefichum	MB-0
Donarine fir	Perudoleuga mucronata	20.4
Evenmore	Platanus coridentalis	20. 6
lied cak	Quereus rubră	40.6
Marris	Acer sectorum	49.6
Long tonf pine		
	Sprietopia makaguni.	
Locust	Robinia parudo acaria	4.4
White cak		44.4
Hickory		
Live out		90'6
fromback		90.4
Liroum vite	Guniagum annetum	21.8
Ebony		20.0
Black fronwood	Krugsodendron ferreum	61.0

8 and I3 lb. per cu. ft. As will be seen from Table I, however, it is much lighter than cork.

Cellular Structure of Batsa Wood The cellular structure of Balas Wood The cellular structure of balas wood, as exhibited under a microscope, differs from that of any other mood known to series of interlacing cellular bodies of microscopic size which, when joined together, form fibers which extend both radially and longitudinally. These cellular fibers are interlaced, and, and longitudinally. These cellular fibers are interfaced, and, by their form and arrangement, give the wood its strength and physical properties. In ordinary woods the thickness of the walls of the cells is generally a considerable proportion of the diameter. The cells which are parallel to the axis of extending a read of the cells which are parallel to the axis of extending the cells which are because their ordinary cells which are defined as "medullary rays," and seek because of their position and composition. The or pith cells, because of their position and composition. The microscopic structure of all the woods involves, in addition, the existence of ducts or vessels scattered through the wood in a longitudinal direction; these serve as a circulatory system for the transmission of liquids and gases during the growth of the tree.

Gross Characteristics

In general appearance, balsa wood resembles basswood. In general appearance, balsa wood resembles basswood, the medulary or pits rays are uniformly spaced, and are radial sections they appear much as in maple or sycamore, as well as basswood, but lack the hardness and susceptibility to polish possessed by these woods. The ducts, pores or vestigare large and remote from each other, and occur singly or in groups in the strands between the pith rays.

The lightness of the wood is one of its most striking fea-res. This is due to the thinness of the walls of the ele-There is rather indistinct evidence of annual rings

TABLE 2.—TRANSVERSE TESTS OF BALSA WOOD

No. 14meneions, in inches.		Modulus of repture.	Deflection, ta tuches.	Quality.	Where made.	
# E B	14, by 86, by 85.	2 MIO 3 190 3 500 3 600 3 600 3 900 3 900 3 900 3 907	755 118 118 118	Kadism Clear Clear Clear Clear Poor Very poor Clear Clear	Cornell.	

in the cross-section. In the specimens studied, the regular concentric rings, so characteristic of trees of temperate regions, do not show.

Minute Structure

The pith, or medullary ray cells have normal position and form, but the cells are not elongated radially to so great an extent as is usually found in woods. The ducts are large, with rather thin, pitted walls Woody fibers of the ordinary sort seem to be absent in this wood, their place being taken by a cellulose tissue very much like the thin-walled tissue of the pith and cortex of ordinary trees.

the pith and cortex of ordinary trees.

The cells making up this tissue are barrel-shaped, whereas woody fibers are taper-pointed and relatively much longer, exceedingly thin, unliquified wills. A section of the tissue in question, examined under a microscope, would not be taken for wood, but rather thin-walled cells or "garrendyma" from he pith or cortex of a stem. The only liquified part is the wall of the duct, and that is relatively weak.

Conclusi

1.—The gross structure of balsa wood is in appearance like basswood, poplar or willow. 2.-Its weight shows that it is fundamentally different from

3.-Its minute anatomy is radically different from any wood

known to the writer.

4.—What correspond to the woods, fibers are not lignified. They are very thin-walled and soft.

5.—The ducts or pores are weakly lignified and are pitted.

They, however, constitute a very small proportion of the wood.

6.—The pith rays are also thin-walled and not lignified. The Strength of Balsa Wood

Table 2 shows tests made under the writer's direction at Sibley College, Ithaca, N. Y., and also as reported by Professor Walter S. Leland, formerly of the Massachusetts Institute of Technology.

Crushing and Compression Tests Three specimens, each 134 by 21/2 by 4 in., with a cross-section of 4.375 sq. in. gave an average of 2,488 lb. per sq. in. Another test of three specimens gave an average of 2,225 lb.

per sq. in. Three specimens, 1 by 1 by 3 in., crushed with loads of 2,210, 2,380, and 2,530 lb. per sq. in., respectively,

Two compression tests, of specimens I by I by 16 in., showed maximum loads of 1,860 and 1,980 lb., and net compression of maximim loads of 1,800 and 1,900 to, and net compression of 0.69 and 0.55 in, respectively.

One specimen, 5½ by 5½ by 23 25/32 in, crushed under a load of 40,900 lb., equivalent to 2,500 lb. per sq. in; and one

slightly smaller gave substantially the same strength per unit of section as reported by Professor Leland in Table 2. Professor Leland states:

"The crushing strength seems to be very satisfactory for such wood-about one-half the strength of white plne or

These tests show the modulus of runture to be approxi-

mately one-half that of good spruce, and their uniformity clearly shows that the material may be relied on both for direct compression and transverse loads.

"It is very elastic material, and when the load was almost at the breaking point, the load on three of the beams was removed and the beams resumed their original shape.

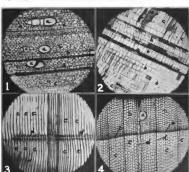
"It is exceedingly interesting to note that it is practically impossible to split the wood by driving nails through it."

A balsa wood plank supported on horses, the plank being 5½ in, wide, 1½ in, thick, and 10 ft. 8 in, between supports, carried two me. The weights carried were 187 and 200 lb. respectively. The maximum deflection at the center was about 10 in.

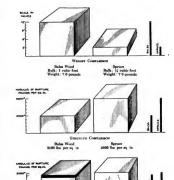
The Habitat

In a recent trip to the Isthmus of Panama the writer found halsa trees growing commonly in all the cleared spaces which were not under cultivation in the Canal Zone. Most of these trees were of small diameter, and evidently quite young, and in every instance they were found in the newly started jungle which has recently been allowed to grow over a goodly part of the Canal Zone since the canal has been completed. In some cases these trees were growing vigorously in the masses of material sliding into the canal. The tree is characterized by a large leaf, from 14 to 30 in. in greatest length, and by the peculiar seed pods which it bears when it reaches a larger peculiar seed pods which it bears when it reaches a larger size. Excellent evidence was obtained that the balas tree size is a size of a constant of the size of t approximating 12 to 14 in. in diameter and from 40 to 60 ft. in height, in about 4 years. A considerable quantity of balsa of large size is to be found near the cleared plantations along the

Chagres River, and in various other places near the Atlantic Coast and the banana plantations. The result of an investigation of the forests of a number of tropical countries, by Mr. Herhert Paschke, undertaken for Capt. A. P. Lundin, indicates that balsa treeg are found in considerable quantities in Honduras, Costa Rica, Colombia and Jamaica, and there is abundant evidence that it grows vigorously in most of the tropical countries of South America. suporousy in most oi the tropical countries of South America. The report referred to indicates that the balas or ockrown is entirely a second-growth wood, and is never found in the virgin forest, except as an isolated tree or two where clearing has occurred. The writer also learned, from his visit to the tropics, that forests composed of any one species do not exist in tropical countries, as they are found in the United States. Tropical trees always grow individually or by themeNets, and very rarely in close proximity to other trees of the same spe-



I-Balaa cross section. Figure 2-Balaa radial section: s-Vessels, b-ary Rays, c-Cells constituting longitudinal fibers. Figure 3-White pine. ary Rays. Figure 4-White pine cross section at onsust rings b-Old cells part with thick walks, new cells below with their walks, a-Vessels or ducts, conjutudinal cells (edd), c-Longitudinal cells (new), d-Medullary Rays



00 lbs per. sq. in Vood about 15 per cent. 4700 lbs. per sq. in. ing increases the weight of Balm Wood ab

WEIGHT AND STRENGTH COMPARISON OF BALSA WOOD AND SPRUCE

cies. This fact makes it necessary to spend considerable sums for transportation in gathering any tropical timber, as great distances through the jungle have to be traversed in order to obtain the timber of a single tree. It is thought that the first person to make a centered commercial use of balsa wood was Capt.

A. P. Ludin, President of the Welin Equipment Company, and formerly connected with the Pacific Mail Steamship Company. From his travels in tropical waters Capt. Lundin knew of the extreme tropical waters Capt. Lundin knew of the extreme lightness of this wood, and its value as a luoyancy material in life preservers and life-boats was sug-gested by its properties. When he indertook to apply the wood practically, however, he found that it was of little value because it absorbed moisture in great quantities, and also because it soon rotted, and also warped and checked when worked. He then undertook the discovery of some means of proof and also prevent it from changing its shape, proof and also prevent it from changing its shape-surgested, Col. Marr's method of treating woods, considered that the constraint of the proof of the constraint of the constrai and also warped and checked when worked. He entirely clogging up the porous system. The paraffin remains as a coaing or varnish over the interior cell walls, preventing the absorption of moisture and the ill effects as to change of volume and decay which would otherwise take place; it also prevents the bad effects of dry rot, which follows the use of any surface treatment for preserving wood of the

The Marr process tends to drive out all water and make the wood water-proof; it improves the quality of being readily worked with tools, without material increase of weight.

^{*} Except where otherwise noted, these tests were mad at Cornell University.



TRADE REVIEW



Merger of Wright-Martin with Motor Company Under Way

Negotiations are in progress involving a merger of the Wright-Martin Aircraft Corporation and the International Motor Truck Corporation. Hayden, Stone & Co. are acting as the bankers in the deal.

It was said that the consolidation would be effected by having the motor truck company take over the business of the Wright-Martin property. The latter, it was stated, would continue to manufacture aeroplane motors only as the business was offered. The activities of the new corporation will be confined mainly to the manufacture of motor trucks.

Official denial was made of reports that the merger will be followed by the retirement of the Wright-Martin preferred stock, of which \$5,000,000 is outstanding. It is likely, however, that the 7 per cent dividends which have been cumulative since November 1, 1916, will be paid off in cash.

in cash, When the Wright-Martin Aircraft Corporation was incorporated, on September 13, 196, it acquired the Wright Company, the Cien L. Martin Company, the Wright Company of the Cien L. Martin Company, the Wright Flying Field. In Company of the Cien Company of America, Inc. The plants are located at Los Angeles, Cal.; New Brunswick, N. J.; Hempstead Plains, L. I., and Port Washington, L. I.

An interest of the company on, L. I.

An interest of the company and yester
day that it was interested to complete its
contracts with the United States government for Hispano-Suira Gusteg governthis has heen done it is estimated the company, after paying all debts and collecting
all bills, will have in the neighlorhood
of \$7,000,000 cash, plus the New Jersey
plant, which is estimated to be worth
about \$2,500,000 cash, plus the New Jersey
plant, which is estimated to be worth

Motors of C-5 Gave Good Account of Themselves

Oakland, Cal.—The engines of the navy dirible C-3, which drove her from Monitauk, L. I., to St. John's, N. F., a distance of 1,110 miles, in 23 hours 50 minutes, an average speed of 43 miles an hours, and a specific of the Union Gas Engine Company.

Less than 200 gallons of gasoline and a little more than six gallons of oil were consumed on the trip. This is considered remarkable by local engine builders, in view of the heavy weather encountered.

remarkable by local engine builders, in view of the heavy weather encountered. The telegram to Fischer, which is from S. H. Blackburn, chief in cluarge of the C.5, and is dated St. John's, May 15, reads; "Motors on C.5 dirigible made trip fine without any attention from Montauk, L. I. Up twenty-six hours. Expect to leave for England in the morning if ship is ready,"

G. S. Ireland Runs the First Exclusively Aeroplane Salesroom

G. S. Ireland has the distinction of being the first man in the United States to open up a showroom and sales office devoted exclusively to the marketing of commercial aeroplanes.



Mr. G. S. Ireland, President and General Manager, Curtise Eastern Aeroplane Co. of Philadelphia

Mr. Ireland is president and general manager of the Curtiss Eastern Aeroplane Corporation of Philadelphia and he will act as distributor of Curtiss aeroplanes and flying beating

Corporation of 1 mindelphia and he will act as distributor of Curriss aeroplanes and flying boats in that territory. In addition to his showroom, Mr. Ireland is planning to operate a land and water-flying school and he has recently opened one of the most modern landing fields in the country.

heids in the country.

Hefore the outbreak of the war, Mr.

freshad had learned how to fly at the

freshad had learned how to fly at the

freshad had learned how to fly at the

services to bliams, P.B. If offered

his services to bliams, P.B. If offered

made a civilian instructor at Mineoha.

Later he was sent to Rich field, at Waco,

Texas. He left Waco, to take charge of

the wing construction on the first Hand
ley-Page bombing machine to be built in

ley-Page bombing machine to be built in

ley-Page bombing machine to be built in

a ley-Page bombing machine to be built in

the wait of the was later commissioned

a captain in the flying service.

Geo. W. Browne Appointed Curtiss Distributer for Middle West

George Horoute for Middle West
George Horoute for Middle Mary Middle of Horoute for the Middle of Middle o

launching land machines for scouting and "spotting" purposes from the decks of the battleships. He was the first man to fly from the deck of a ship. During the greater part of the war, he was in charge of all aviation activities at the Great Lakes Naval Training Station, Illinois, the largest naval training station in the world.

Personal Pars

Hal G. Trimp, for the last four years manager of the Chicago office of the Green-Fulton-Cunningham Company, has joined the staff of the Campbell-Ewald Company, Detroit, Chicago and New York. Mr. Trump will make his headquarters at the Detroit office.

York. Mr. Trump will make his headquarters at the Detroit office, quarters at the Detroit office, recently discharged from the Air Service, is now connected with the Academy of Applied Aeronaulics in Chicago, Ill., as general work of preparing all technical material for use in instruction in the Aviation Mechanics Schools, as well as his connection with Air Service publications, has portant positioned him to fill this important positioned him to fill this im-

Andrew V. Terek, recently released from the Naval Aviation Service, has returned to the Bantam Ball Bearing Co., Bantam, Conn., as master mechanic in charge of the upkeep of the factory.

And the specific of the second of the second

was formerly associated with S. F. Bowser & Company, Fort Wayne, Indiana. During the war Mr. Corey was Assistant Manager in charge of aeroplane instruments in the Production Engineering Department, Bureau of Aircraft Produc-

Electrically Operated Tachometer Successfully Designed

A successful aeroplane tachonnete melpoving electric drive for use on aeroplanes and dirigibles is described in the German publication, Der Motorsugen. The device consists of a small D.C. genwhich acts as transmitter. The current generated is received by a moving coil agivanometer whose scale is graduated in recoultions per minute.

The armature of the generator is of drum type, and permanent magnets made of high alloy tungsten steel provide an even magnetic field, the whole being enclosed in a dustproof bayonet-joint cap. The moving coil of the exercising galvon-The moving coil of the exercising allows the steel of th



Chicago-Cleveland Aero Mail Route Makes High Record of Reliability

The Air Mail Service established May 15, 1919, between Chicago and Cleveland, has completed a very remarkable record of dependability for the first week of its operation

its operation.

A report of the weeks' operations shows that 4,100 miles have been flown out of a possible 4,480 miles and 28 trips made out of 30, scoring 93 1/3 per cent performance. There was not a single forced landing for any reason. A 43-mile gale prevented the two flights which were From Cleveland westbound to Chicago

a total of 87,200 letters were carried for the week, and 74,600 letters eastbound

from Chicago to Cleveland.

The average flying time for the week from Cleveland to Chicago was 3 hours from Cleveland to Chicago was 3 hours and 40 minutee, and from Chicago to Cleveland 3 hours and 20 minutes, the difference being due to the prevailing head winds from the west. The distance between Chicago and Cleveland is 325 miles. The best time made was on one trip from Chicago to Cleveland in 2 hours and 48 minutes. The longest time was 4 and 48 minutes. The longest tim hours from Cleveland to Chicago.

G. G. Budwig in Charge of Testing and Delivering New Mail Planes

Delivering New Mail Planes
G. C. Budwig, whose photograph we published last week, and who is in charge of
the testing of the new De Haviland mail
planes at Belmont Park, N. Y., and who
flies the machines to Bellefonte, Pa., and
Cleveland, Ohio, for final delivery to the
Western Division of the Aerial Mail
Service, learned to fly on a Wright
hydroacroplane early in 1914. When he had completed his instruction, he engaged in exhibition and passenger carrying in exhibition and passenger carrying work. After a period of macivity, he resumed flying at the outbreak of the war, when Budwig went to the Curtiss school in Buffalo and learned the 'Dep' control. Thereafter he worked as civile government fields: Channte Fields, Kelly Field, Rockwell Field and March Field. While at San Antonio, Budwig also cated as Chief Instructor of the Stinson School of Piving. At Rockwell Field he was at first Doal Instructor and later he was at first positions of the was at first positions.

he was an instructor in acrobatics, and was then advanced to Stage Commander of Final Review. He remained in the



Lester F. Bishop, the first serial mail pilot to carry letters from Chicago to Cleveland

government service until the position of Civilian Flying Instructor was abolished by the Secretary of War.

Lester F. Bishop Made Pioneer Mail Flight of Cleveland-Chicago Route

Lester F. Bishop, the first Air Mail pilot to carry mail into Cleveland from Chicago, entered the air game as a mechanic for the Champion Aeroplane Company of Chicago, Illinois, in 1915. He Couppany of Chicago, Illinois, in 1915. He received his first training in flying in the spring of 1916 and until June, 1917, was connected with Eddie Stinson and R. F. Shank in conducting the National School of Flying at Houston. Texas. In June, 1917, he was appointed Student Flying Instructor at Chanute Field, Rantoul, Illinois, structor at Chanute Field, Kantoul, Illinois. In September, 1917, he was transferred to the Selfridge Field, Mt. Clemens, Michi-gan, and on December 1st was trans-ferred to the Rich Field at Waco, Texas, at which field he was assigned as acrobatic instructor. He remained at this field until July 15, 1918, when he was assigned as test pilot for the Bureau of Aircraft Production. Detroit District, testing the DH4 Bombing planes preparatory to their being shipped overseas. He was engaged in this work until his appointment in the Aerial

Mail Service on December 27, 1918. to the present time he has flown over 1,500 hours with but two slight accidents.

Only One Forced Landing on Cologne Mail Route

Mail Route
London.—The aerial mail service between Maiscoucille and Cologne, a distance of 225 miles, reports that after three weeks of operation there were only three days when the weather prevented the mails being carried, and there was only one forced landing; 465 bags of mail only one forced landing; 400 bags of mail were carried, and the average time for all flights was 2 hrs. 16 min., while the rec-ord was 1 hr. 45 min. On the majority of days on which the mails were carried from March 1 onwards it was found impossible to continue the training of the possible to continue the training of the homing pigeons attached to the unit. Moreover, as it was necessary to fly through driving rain, specially protected propellers had to be supplied, as the rain so seriously damaged the ordinary type during one journey that they became un-safe for further use. D.H.-9A planes, op-erated by the 110th Aero Squadron, are

Book Review
AEROPLANE CONSTRUCTION
AND ASSEMBLY, by N. W. Leslie and
J. T. King. This book is an excellent
treatise for the aeroplane mechanic. The
first section of the book is devoted to
nomenclature and definitions. A comprehensive set of diagrams gives the location hensive set of diagrams gives the location of every part of the fuselage, wings and controls. Then follow instructions for unpacking a plane and setting it up, and adjusting and truing the wings. Installation and care of the motor, inspection and preparation of the engine before flights a dequately dealt with. Care, alignment, balancing and checking the pitch of propollers is described in terms which are easily comprehended by the aeroplane me-

easily comprehended by the aeroplane me-chanic. The care and inspection to be given a plane after flight is the subject of several comprehensive pages. In Several comprehensive pages. In the construction of an aeroplane and the theory of flight. The qualities of the various types of wood used for different purposes, the design of all types of shackles, turnbuckles, fittings of all types, strut sockets, clevis pins and cables are described and illustrated. A section of this part of the book is devoted to a discussion of methods of aligning the fuselage and cor-rection of mistakes in rigging.



NAVAL and MILITADY AEDONAUTICS



Sales of Surplus Aircraft Supplies

Washington, D. C .- According to an official statement from the Director Sales, the sales of surplus materials have been as follows:

Washington, D. C .- The following is an official statement from the Statistics Branch of the General Staff,

	Mat. 18-21	Mar. 22-28	Mar. 29 April 4	April 5-11	Total	
Buraau of Aircraft Production	\$11,093 52,484	\$5,310	\$59,302 2,780	\$105,620 6,686	\$1,092,645 466,436	
Totals	\$63,577	\$5,310	\$62,082	\$120,306	\$1,579,181	

Of the amounts of which the cost is known, the following statement is made known, the following statement is made regarding the ratio of cost to amount re-ceived: The Bureau of Aircraft Produc-tion received \$1,089,186 for material cost-ing \$1,211,825, or 90 per cent. of its cost. The Department of Military Aeronautics received \$455,436 for material costing \$025,772, or 73 per cent. of its cost.

Sales by the Bureau of Aircraft Production since the above tabulation were as follows: Week ending April 18, \$8,099, April 25, none; May 2, none; May 9, \$16,856, making a total of \$1,450,528 since November 11.

For the Department of Military Aero-nantics, the figures are as follows: Week ending April 18, 85,096; April 25, \$1,775; May 2, \$423; May 9, \$20,911, making a total of \$493,661 in sales.

Balloon Flights Reveal Metereological Data

A balloon ascension to study upper currents and meteorological conditions over Nebraska, Arkansas, Missouri and Mis-Nebraska, Arkansas, Missouri and Mis-sissippi under influence of the great rivers, was carried into effect recently from the United States Army Balloon School, Ft. Omaha, Nebraska, Lt. Col. J. W. S. Wuest's halloon, main-taining a 5,000 elevation, landed at 2:30 in

the afternoon near Little Rock, Arkansas, the atternoon near Little Rock, Afkansas, 500 miles, having been in the air 16 hours. Capt. Goodale's balloon, maintaining 10,000 feet, landed at 1:30 P.M. at Arcola, Miss, 600 miles, having been in the air 15 hours, the speed being faster at the higher elevation. The upper currents confirm the theory of meteorologists in running parallel to isohars. Other scientific data s in course of preparation from notes taken on the voyage.

Target Practice Required of Air Service Men in Aerostatic Branch

Instructions are being issued prescribing target practice for the Air Service. These instructions apply only for this seaon. For Lighter-than-air Organizations rifle and pistol practice is prescribed for those armed with these weapons, Heavier-than-air Organizations will not be required to participate in target practice fere with other work, and Air Service personnel, not included in either category, will be excused from target practice during the season of 1919.

All orders for planes and engines have been completed except one order for Hispano-Suiza 300 H.P. service engines, which is forecast for completion in May.

The number of planes and engines de-livered before and since the date of the armistice, with the percentage distribu-tion, is shown in the following table:

Per cent.

ARTICLE.	Before Armistice.	Since Armistice.	Total.	Before Armistice.	Armistice.
SJ-1, training	1600	0	1600	100	
Penguin, Irainng	300	10	300	100	
S4B, training	100	0	100	100	
Handley Page, service.	101	6	1.07	94	6
	3746	346	4092	92	8
JNH, training	1690	274	1964	86	14
	372	125	497	75	25
DH-4, servica	3227	1615	4842	67	33
Le Pere, service	- 7		25	28	7.2
E-L training	12	116	128	9	91
SE-5, training	5	52	57	9	91
Engines.					
A7A, fraining	2250	0	2250	100	
Lawrence 28 H.P., tr.,	450	t	451	100	
Gnome 100 H.P., tr.,	278	2	280	99	1
OX-5, training	8318	1182	9500	88	1.2
Hispano 150 and 180					
H.P., training	3905	1170	5075	77	23
U. S. 12 Navy type.					
service	3645	1695	5340	68	32
U. S. 12 Army type,					
service	9929	5209	15138	66	34
Le Rhone 80 H.P., tr.	1057	1443	2500	42	58
Bugatti, service	8	32	40		80
Hispano 300 H.P., ser.	8	359	367	2	98
U. S. 8 Army type, service	0	15	15		100

Twelve Per Cent American Planes West Front When War Ended

The following statement was prepared by Statistics Branch of the General Staff: Comparison of Aeroplane Strength of Allies and Enemy Air Service at Date of Armistice

Front	Number	of Plan
French		3,321
German		2.730
British		1,758
American		
Belgian		153
Total Allied		5,972
Total Enemy		2,730
Italian Front		
Italian		812
Austrian		622

Plane and Engine Deliveries Before and Comparison of Balloon Strength of Al-After Armistice Announced lied and Enemy Air Services at

	Date of Armistice	
	French and Belgian	
	Front Number of	
	German	170
	French	72
	British	43
	American	23
	Belgian	6
ŀ	Total Allied	144
	Total Enemy	170
	Italian Front	
	Italian	32
	Austrian	26

More Aircraft Contract Cancellations Withdrawn

Washington, D. C.—According to an official statement issued by the Statistics Branch of the General Staff, during the four weeks ended April 26, 1919, the Bureau of Aircraft Production withdrew cancellations and suspensions of contracts to the amount of \$6,944,144, thus reducing the total cancelled and suspended con-tracts to \$493,735,473. These withdrawals are practically all for the spare parts and accessories. Following is a summary of the value of cancellations and suspensions of contracts with the per cent suspended:

	Total Obligations	Total Suspensions	Sup-
Chamicals and chemical plants Instruments and	\$15,285,255	\$14,203,006	
Ascessoties	12,830,326	10,517,212	82
Fabrics, lumber		165,727,433	79
and metals Engines and spars	9,347,244	6,926,223	74
Balloons and sup-	410,188,300	276,062,132	67
place	16.442.168	9,497,494	58
Miscellaneous	22,369,092	10,801,973	48
Total	\$496,993,036	\$493,735,473	

From the date of the armistice to April 26, 1919, cancelled and suspended con-tracts representing an original value of nearly \$118,000,000, have been liquidated at a saving of over \$92,000,000 or 78 per cent.

In the following diagram is shown the per cent of actual saving and per cent cost of termination of contracts, for various items

			Par Co	rnt
	Value of Cancelled Contracts	Termination Charges	Actual	Termination Charges
Balloons and				
supplies	\$3,834,664	\$613,032	84	16
Engines and	96,385,892	20,752,433	78	22
Fabrica, lumber			-	
And metals Asroplanes and	3,810,088	833,140	78	22
spara parta	4,346,850	1,073,622	75	25
Chemicala and			-	
cham'l plants Instruments and	7,308,948	1,939,890	73	27
accessories	1.340.972	393,994	71	29
Miscellaneous	912,611	193,032		21
Total	8117.940.025	\$25,799,143	78	22



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. NSWahon



PACIFIC NORTHWEST MODEL AERO 921 Roveono Bouleverd, Scattle, Wosh.
BAY RIDGE MODEL CLUB
8730 Ridge Bouleverd, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE

Bioemington, Indiena BroadDWAY MODEL ARCO CLUB B31 North Broedwey, Beltimere, Md. TRIANGLE MODEL AERO CLUB Baltimere, Md. NEBRASKA MODEL AERO CLUB Lincolo, Nobraske

DENVER MODEL AERO CLUB 2820 Roleigh St., Denver, Colo. BUFFALO AERO SCIENCE CLUB c o Christian Weyond, 48 Dodge St., Buffelo, N. Y. THE ILLINOIS MODEL AERO CLUB

130, Auditorium Hotel, Chicogo, III. SCOUT MODEL AERO CLUB 304 Chambor of Commerce Bldg., tedianapolis, Indiaea MILWAUKEE MODEL AERO CLUB

CONCORD MODEL AERO CLUB

GO Edward Werner, Creered, MaasMODEL AERO CLUB OF OXFORD

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Model Aeroplane Contest Prizes

The medals and the cup for the coming model aeroplane contests have been selected from a large stock of aeroplane iewelry and trinkets manufactured by the Arthur Johnson Mig. Company, 14 Church Street, New York City. To say they are the most attractive ever offered for an event of this

they are the most attractive ever offered for an event of this kind would be putting it mildly.

The cup for the scale model prize is of bronze of a very pretty design with two handles, and etched with silver. The interior is lined with gold. On the face of the cup are engraved the words AEKIAL, AGE TROPHY.

The medials of gold, silver, and bronze have on the face a line medials of gold, silver, and bronze have on the face a line which the silver is a minimatre aviation corps emblem, namely; a propeller with wings extending on each side from the propeller hub. This is in silver, which adds greatly to the appearance of the medals.

On the back of each medal the words AERIAL AGE.

On the back of each medal the words AERIAL AGE MEDAL are engraved. The winners can have anything they desire engraved on the medals as sufficient space is left for

The winners of the above prizes will be envied by every model flyer who is not lucky enough to possess one, and when the next set of events comes around we will have to hold elimination contests to keep down the number of competi-

The continued good weather of the last two weeks has brought out many good model flyers in this vicinity, and we hope out-of-town clubs are having the same good fortune. I have received letters asking whether it is too late to enter

the contests. It is not too late, in fact you have until the last day of June to compete, hut I should not advise waiting until the last minute, as something might happen to prevent the contest being held, such as had weather, or lack of witnesses.

By the time this issue is in your hands the contest will have begun and, let us hope, new records made.

Scale Model of the Loening Monoplane

Scale Model of the Loening Monoplane
The model shown in the accompanying photographs, was
made by the meminers of the Aero Science Club of New York.
This model is correct in every respect, regulation riles,
spars, etc., being used, and the state of the scale-model contest, and many of the members of this club are hard at work on other types.

The Aero Science Club is the oldest model club in exist-

ence and is ready to accept anyhody into the club who is interested in aviation, whether it be in the models or in the larger machines. These young men are all hard workers and are strict students of aerodynamics. They are lucky inasmuch as they have on the membership list some of the oldest aero-

as they have on the memory-in its some of the oldest are name men in the country, who are advisors of the club. Two of these men are noteworthy: Mr. Durant, whose Tather was the first to jump from a balloon in this country, and Mr. S. Y. Beach, for some time Aeronautic Editor of the Scientific American, and an inventor of many aeroplane

If you have any clear photographs of models send them to

the Model Editor, and if they are of interest to the readers we will reprint on this page.

Should a young man continue to build models all his life, and not branch out to the study of the larger machines?

not oracin out to the study of the study in the stage meaning. This is a question that many model filers ask themselves, and a great number ask me, so I will astrace it. After you for a great number of the stage o building and assembling a small size man-carrying aeroplane.

Most of the old-time model aeroplane builders built large machines soon after they took up model flying, and many of them taught themselves to fly These young men are to-day the best aeronautic engineers in the country, and are holding responsible positions with the Government and private con-

I intend starting another series of articles on the large I intend starting another series of articles on the large machines in the near future and will devote most of the space of this page to this type of machine for about four or five issues. It is hoped that these articles will be received with as much favor as the last series covering the Design and Construction of the FORD MOTORED AEROPLANE.



Scale model of the Loening Monoplane, boilt by the members of the Aero Science Club



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Shakespeare as an Airman

1. THE SQUADRON,

"... All furnish'd, all in arms,
All plum'd, like estridges that wing the wind,
Bated, like eagles that have lately bath'd." (Henry IV, Pt. I, IV., 1.)

II. THE PILOT TO HIS MACHINE. When I bestride him, I soar, 1 am a hawk."
(Henry V., III., 7.)

III. THE PUPIL TO HIS INSTRUCTOR.

"We could not stall together." (Antony and Cleopatra, V., 1,)

IV. THE C.O. (loq),

". The air

Nimbly and sweetly recommends itself
Unto our gentle senses."

(Macheth I 6) "Ah! Stand by."

(Antony and Cleopatra, III., 9.)

V. Chorus or Night-Raid Phots.
"Sweet moon, I thank thee for thy sunny beans;
I thank thee, moon, for shining now so bright."
(Midsummer Night's Dream, V., 1.)

VI. CHORUS OF MECHANICS. "Fly! Not we!"

(Antony and Cleopatra, III., 9.) VII. THE TRANSPORT OFFICER.

I am no Pilot. (Romeo and Juliet, II., 2.)

VIII. TAKING OFF. "Now to the Goths, as swift as swallow flies." (Titus Andronicus, IV., 1.) "The deep damnation of his taking-off." (Macbeth, I., 7.)

IX. IN THE AIR, N THE AIR.

"By heaven, methinks it were an easy leap

To pluck bright honour from the pale-faced moon,"

(Henry V. Pt. I., I., 2.)

"For courage mounteth with occasion."

(King John, 11., 2.) . Flies an eagle flight, bold and forth on, Leaving no tract behind.

(Timon of Athens, I., 1.)



In the clouds, scorning the base degrees By which he did ascend,"

(Julius Caesar, Il., 2.) "To be imprisoned in the viewless winds, And blown with restless violence round about The pendant world."

(Measure for Measure, III., 1.)

"Servile to all the skyey influence."
(Measure for Measure, III., I.)

X. OVER THE LINES. "Witness these trenches made by grief and care."
(Titus Andronicus, III., 2.)

X1. THE OBSERVER.

Of very expert and approved allowance.

(Othello, II., 1.) "Why, that's my dainty Ariel." (Tembest, V., 1.)

XII. THE ENGINES FAIL.

"And O you mortal engines, whose rude throats Th' Immortal Jove's dread clamours counterfeit, Farewell!" (Othello, 111., 3.)

XIII. HOPE, . Why may not I

Glide thither in a day?" (Cymbeline, III., 2.) XIV. THE LAST CHANCE.

". . . Let her down the wind (Othello, III., 3.)

XV. THE CRASH. "Oh, what a fall was there, my countrymen."
(Inlius Caesar, III., 2.)

ir. sir. thou art so lucky That we must leave thee to thy sinking."
(Antony and Cleopatra, III., 2.)
"Will this gear ne'er be mended?"

(Troilus and Cressida, I., 1,) ALEC. MACDONALD in Flying (London).

The Seven Ages of Man

(By Air-Mechanic W. Shakespeare) The R.A.F.'s a stage,

And all its personnel are merely players; They have their crashes and calamities, Iney nave their crashes and calamities, And each man in his time breaks many parts. And each man in his time breaks many bette dizzy heights. Then the first zolar, with torn and grimy face, Creeping like small, ungainly, from the helge. Then the subaltern, sighing like furnace, With worful ballad penned to the lady driver,

Then the Captain, full of strange jests (somewhat like Wilkie Bard)

Seeking the bubble reputation, even in the Archie's mouth. Seeking the binoic replication, even in the Archive Then the Major, too fat to fly, with oak-leaves on his hat, Bestriding all the place like a Colossus.

Then the C.O. (whose massive coat is interlined)

Sitting in judgment on his cowed Ack Emmas, Sitting in Judgment on his cowed Ack Emmas.

Last scene of all, which ends this strange eventful history,

Reveals a General at the Ministry,

Sans eyes, sans teeth, sans wisdom, and sans everything!

G. S. in Flying (London).

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(Continued from tage 626)

as soon as it is finished will make the most complete and accurate map ever assembled.

The initial work is now being done from the various flying fields in this country still in operation. Perhaps the most work thus far accomplished is that done at Post Field, Fort work thus far accompaished is that done at rost rice, rort Sill, Oklahoma, where a map is now almost completed cover-ing a strip of territory 30 miles wide and 130 miles long. This strip runs from Call Field, at Witchita Falls, Texas, to Oklahoma City, Okla, and is the work of pilots, observers and aerial photographers of the service station at Post Field.

"Most of these pictures were made from a 6,000-foot elevation from De Haviland planes equipped with a Liberty-twelve motor. The men engaged in the work have already taken 650,000 isochromatic plates, and the job has not yet been finished. When this is considered and the fact also that the pictures taken represent a strip of territory of about four pictures taken represent a strip of territory of about four square miles and each picture overlaps for about one-lail square miles and each picture overlaps for about one-lail fits on the enormous ground board on which it is patted, the size of the job of aerial mapping the entire United States may be realized. It is also at once apparent that the small army of airmon trained during the war period can still be mighty useful to Uncle Sam.

"When a certain section has been pictured and each developed proof been pasted, the whole is photographed and made into a large section map, and as the sections are finished they are in turn put together as were the individual pictures, in the first operation. In order to facilitate the movement of in the first operation. In order to facilitate the movement of the pilots and photographers, portable hangars have been placed along the route, and the men put in eight hours a day taking pictures. Motor lorries carry dark rooms and development equipment, keeping pace with the pilots so that there is not a lost minute in developing the plates and completing the majos. If the boards on which the proofs are placed were assembled in one line it would be about a mile long and a quarter of a mile wide.

"One of the proofs of the practicability of this method of accurate map-making is the story of the military map made in this manner of the Panama Canal Zone. After a corps of engineers consisting of one regiment had spent six months in attempting to make a map of that zone and met with failure, one squadron of the air service, with twelve ships and pilots and a section of photographers were sent into the region. In two months time they had completely mapped the zone. This map has never been released by the Government because of its great military value.

"Plans have been made by the Director of the Air Service, it has been said at Washington, to map the whole country, but because of the failure of Congress so far to provide for the continuance of the air service on a large scale, the only maps now being made are in the vicinity of the flying fields still operating.

Aeronautic Instrument Development Discussed

Commercial success of the aeroplane can be assured through the use of instruments already perfected. Safety devices that constantly check up the aeroplane during its flight giving the operator a sixth sense and thus enabling him to maintain perfect control at all times and avoid pitfalls to which he would be a victim without their aid of artificial check-up.

These were the conclusions before the Second Pan-American Aeronautic Convention of Charles H. Colvin, M.E., a

pinneer in the invention and perfection of aircraft instru-

"Many pilots do not realize the extent to which they are dependent on their vision or of cloud formations below them, for maintaining the correct attitude of their plane. The only way to appreciate when an aviator is up against flying in a fog. clouds or at might, is to be there with him. Sometimes he cannot see the extremity of the wings of his planes. He cannot tell if he is level, if he is turning-that is, without in-

"To realize the seriousness of the stability problem we have but to refer to a recent report of the U. S. Air Service. Out but to refer to a recent report of the U. S. Air Service. Out of 274 fatal accidents which were reported, where the cause was known, 178, or 65 per cent, resulted from loss of control due to the plane getting into unstable positions: side-slips, skids, nose dives, stalts and tail-spins.

"For maintaining an aeroplane safely longitudinally, or fore and ait, the most valuable instrument is the air speed indi-cator or buoyancy meter. The reading of this instrument is a direct indication of the buoyancy or lift of the machine. It does not indicate the correct air speed, however, for at higher altitudes greater speed is necessary to maintain the proper buoyancy. A pilot will learn the buoyancy indication lighter autitudes greater species in instance, and proper lauyaney. A pilot will learn the buoyancy indication (erroneously indicated as air speed) which corresponds to level flight of his plane for a given engine speed. By noting both his tachometer reading and his indicated air speed he can thus tell very closely if he is descending, climbing, or flying level. Occasional reference to the altimeter will check this. A longitudinal clinometer may also be used in this connection, but is neither as reliable nor as sensitive as the air speed indicator.

"For maintaining his proper lateral attitude a banking indi-cator is used. This instrument has been practically ignored by the U. S. Army, which probably accounts, in a measure, for the large number of accidents due to loss of control.

"The most successful banking indicator consists of a very resistive arrangement of pendiums so that a large indication is given for a very slight divergence from the proper lateral position. By keeping the indicator from appearing, the pilot can keep his plane level in flying straight, or properly banked in turning.

"The lateral and directional movements of a plane are closely inter-related. In turning one also banks, and vice versa, therefore we must consider directional stability at the same time as lateral stability.

"If the banking indicator is used, the pilot may start."

If the banking indicator only enough, he will get nowhere, going in circles. Here the turn indicator comes to the rescue. This is a small instrument using a gyroscope as a very sensitive indicator of any divergence from straight flight. Thus by keeping his turn indicator neutral—that is, indicating straight flight; and also keeping his banking indicator on center-indicating proper lateral attitude, a pilot can fly straight and level through fog, clouds or darkness.

"As the turn indicator will not show very minute turns, he occasionally checks up his course with the compass.

"It is my belief that stabilizers, particularly of direction, will come into general use and be found highly advantagewill colle into general use an instruction and an instruction of the collection of t compass occasionally to check up the automatic control.

(Continued from page 635)

Scott during the explorer's Arctic expedition.

Frederick Wyatt of the Marconi company, who is to be the wireless operator, is now on his way to St. John's on board the steamship Sachem.

A visit to the Handley Page field and an inspection of the machine in the course of being assembled serve to convince one that the promoters of this enterprise aim to eliminate all possible chance, and that nothing of the freakish enters into their designs. At the very start they dis-

played good judgment in the selection of their field, and the place is regarded as the most suitable for the purpose that could be found in this country. Harbor de Grace, situated on the north side of Conception Bay, is three miles deep and one wide. The headlands of the port jut out into the bay, which is an arm of the Atlantic thirty miles deep and fifteen miles wide. At the entrance of this port mules wide. At the entrance of this port on the north side the Handley Page machine is being erected. The field where the work is being done and from which the flier will take off comprises forty acres. It is 900 yards long and 200 yards wide, and has a seaward grade of 3 per

cent The local name of the place is Bear's Cove.

The principal portion of the field is owned by the Roman Catholic Church and was rented to the Handley Page company by Bishop March. In addition, there are more than twenty other owners of portions of the field. Boundary fences, telegraph lines and six farm buildings, intelegraph lines and six rarm outlungs, in-cluding two dwellings, were removed by the-company. The whole field has been levelled and rolled, providing a hard surface. It lies due east and west and the takeoff can be made with the winds from the southwest to northwest and from southeast to northeast.

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Parts catalogue now being compiled. A postal card will bring it.

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(Continued from page 639)

Reel Antenna and Accessories

The antenna reel group for this set consists of the reel mechanism, a removable drum with antenna wire and spare drums with complete antennae on them. The wire from the reel runs through a take-off pulley and passes through the lead-in insulator in the side of the hull of the boat. It then passes through either a strut pulley, or wing pulley, depending upon the type of the boat.

Real Machaniam

A cast aluminum plate, clamped to one of the main struts in the hull of the boat, carries a shaft on which the drum turns. On this same shaft, next to the attachment plate, there is a brake drum of cast aluminum, and around this drum a cast turns. iron brake band. The band is sprung over the drum and prefrom prake casto. It made to supering over the urum and pre-vents it from turning except when a cam which is attached to the brake lever springs it open. A pin on the brake drum engages holes in the main drum, when the latter is put on the shaft. The crank by which the main drum is turned has a square hub on which the drum sets. It is shipped onto the shaft, and latches in place. The latch is released by a latch handle just behind the arm off the crank. To remove the drum, to put a new one in place, the operator grasps the arm of the crank, and in so doing also grasps the latch handle and releases the latch. He then pulls the crank and drum off together. One drum may then be slipped off the hub of the crank and a new one put on, and the two slipped back onto the shaft.

Reel Drum and Antenna

The drum is a pressed steel spool, black japanned, and will hold about 600 feet of the standard antenna wire. It has a square hole at its center which fits the hub of the crank. The antenna wire has a ball at the reel end, and this ball is dropped through a hole in the drum face. The other end of the wire is attached to a swivel, and this in turn is attached to the "fish" or weight.

Lead-in Insulator

The lead-in insulator is a moulded "electrose" fitting, with The lead-in insulator is a moutled "electrose" fitting, with a metal tube running through it, and a wide flare at either end, so that the wire cannot carch on the ends of the tube even if a hole in the side of the hull. The antenna connection from the set is brought to this insulator. When the antenna is out, the ball on the reel end of the wire rests against the inside flare of the insulator. The wire is thus entirely disconnected sary to red up, the hall is grasped, and of course brings the wire with it. The ball is passed through the take-off pulley and dropped through the hole in he drum face, and the crank is turned. The brake mechanism is arranged so that the process. process.

The equipment has given excellent account of itself. For reception, a six-valve vacuum tube receiver is used. In addition, a half-kilowant spark transmitter driven by a fan was provided. Description of these instruments is not yet permitted by the Navy Department.



Vol. 9, No. 14

JUNE 16, 1919

10 CENTS A COPY



O Newscaper Ellustrations, L

Cricklewood Aerodrome, near London, as viewed by a passenger of the recently inaugurated Handley Page Service

\$129,000,000 Asked for Aeronautics

Lig and by Goog

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CHAMPION



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JUNE 16, 1919

No. 14

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NEW YORK, JUNE 16, 1919

NO. 14

\$129,000,000 ASKED FOR AERONAUTICS

HE Army is asking \$83,000,000 for aeronantics, the Navy is asking for \$46,000,000. The General Staff is supporting the plans for a sub-

stantial Air Service in the Army just as the General Staff is supporting the plans for a substantial Air Service in the Navy.

Congress seems to be in favor of an extensive program, which shall include a substantial development of the aerial mail service and shall assist the development of civilian aeronautics.

Especially gratifying is the fact that the program includes the acquisition of dirigibles from Great Britain and the construction of dirigibles in the United States.

The details of the Navy aeronautic program, as submitted to Congress, are as follows:

Aircraft for fleet use, \$4,504,025.

Purchase abroad of ten special fighting and spotting planes, \$200,000

To erect one large hangar for dirigibles, \$1.850,000.

To establish a rigid dirigible construction and operation station, \$6,264,000.

To construct two rigid dirigibles, \$400,000. To purchase a British rigid dirigible, \$2,500,000. Conversion of collier Jupiter as aeroplane earrier, \$500,000. To purchase and convert two merchant vessels into aircraft nders, one for planes and one for lighter than aircraft, \$5,261,250.

To cor \$7,813,107 continue operations of all established air stations.

To continue experiments and developments of all types, \$9,405,000,

To equip Marine Corps advanced base units with aircraft, \$3,933,100.

Miscellaneous, \$300,000.

Total, \$46,531,482.

It is considered significant of what the future trend of air-craft development is to be that the Navy is already asking that almost half of its appropriation shall be for dirigibles,

PREPARATIONS FOR TRANSATLANTIC FLIGHTS AT ATLANTIC CITY AIRPORT

PREPARATIONS are being made at the Atlantie City Airport for a number of projects for non-stop trans-Atlantie flights, starting from or ending at the Airport. It is understood that the projects for non-stop trans-Atlantic flights include two British, two Italian and three American plans. Three of the projects contemplate the use of huge dirigibles, and four the use of land aerophanes and scaplans.

Representatives of the Aerial League of America and the Aero Club of Atlantic City and prominent American Aces and naval aviators and wealthy sportsmen and business men have held a number of conferences with engineers, hangar builders and makers of hydrogen and plans are being drawn for large hangars for trans-Atlantic seaplanes and land aeroplanes and for hydrogen plans for dirigibles,

The advocates of land aeroplanes are making headway with their arguments that the large land aeroplanes equipped with multiple power plants will prove to be most efficient for trans-Atlantic flights, as they will permit starting from the Airport here and landing at the aviation fields in England. France and Italy, or vice versa.

Towers sixty-five feet high have been built to mark the tenmiles course for testing the speed of the trans-Atlantic flyers. This course is so arranged that both seaplanes and land aero-planes can make their tests and in case of a forced landing can land on water or on land, whichever may be the most desirable

Plans are under consideration for the construction of sea-Plans are under consideration for the constitution of sea-plane hangars at the extreme end of the Airport, facing the Great Thorofare which affords over ten miles of calm, pro-tected water where tests can be conducted. Rough water tests will be conducted at the Inlet and over the ocean,

A trans-Atlantic Flight Record Hall is being established A trans-Atlantic Flight Record Hall is being Stablished at the Airport Administration Building, where airmen will find all the charts and data available and needed for trans-Atlantic flights. This data already include numerous charts showing all the possible routes for flying across the Atlantic, the meteorologic charts and reports of meteorologic contents and reports of the second of the second contents of the se of all the NC seaplanes, as well as the British trans-Atlantic

type planes.

Mr. A. S. Abell, 3rd, is the Secretary of the Committee in

MF. A. S. Abell, 37d, is the Secretary of the Committee in charge of the trans-Atlantic flight data. An Advanced the Trans-Atlantic flight data mobilized in different parts of the United States during the past month to be used to fill up the British dirigible R-34, which is due to come to the United States this month and is scheduled to land at the Atlantic City Airport, which affords the best unobstructed landing place in this part of the country.

the best unobstructed landing place in this part of the country. An indication of the fact that permanency is contemplated and indicated the permanency is contemplated that the permanency is contemplated to the permanency of the These plants cannot be had without permission from the War Department and a representative has been sent to Washington to secure the official release,

Invite NC-4 to Atlantic City

Secretary of the Navy Josephus Daniels was invited to send transatlantic flyer NC-4 to the Atlantic City Airport to be transatiantic type and the Atlantic City Aliport to be placed on public exhibition there in order that the hundreds of thousands of people who come from all parts of the country might be able to see it. Officials of the aero clubs are convinced that Atlantic City, because of its ever-changing population, would afford opportunity to more different people to see the lamous ocean-tripper than any other place in the country and that it would prove one of the greatest boosts for aviation that could be placed before the public.

Albert T. Bell, president of the Aero Club of Atlantic City. and Samuel P. Leeds, president of the Atlantic City Chamber of Commerce, who are closely cooperating with the Aero Club nf America, the Aerial League of America and the sixty-two clubs affiliated with these organizations, have extended the

invitation.

Mr. Bell, in the invitation, pointed out that the Atlantic City Airport is the first and only airport in the world and one that affords exceptional facilities for land and water planes. The airport is located within a few minutes' walk of the heart of the city and 3,000 feet from the Boardwalk, and therefore easily accessible to the public. Emphasis is laid on the fact that the Atlantic City Airport is the only place where the NC4 can be flown to and exhibited without danger of breakage through transportation, because the Thorofare waters, which form the water course of the airport, are protected and still at all times and ideally suited for large seaplanes both for take-offs and docking.

Stress is also placed upon the fact that ten million people who come to Atlantic City each year represent more territory than any similar number of persons visiting any single city in the world, who would sooner come to Atlantic City during the summer months than any other place. It is estimated that close to a million and a half people will visit Atlantic City

during July alone,

The large size of the NC-4 makes it almost impossible to exhibit it anywhere else than at a naval station, where there are no facilities for accommodating the large crowds. can easily be done at the Atlantic City Airport, and in addition there are hotel facilities to take care of any crowds that may

inere are notes facilities to take care of any crowds that may make the trip to see the ship may be constructed to the construction to Commander Read, Lieutenan Stone and the other members of the NC4 crew to come to Atlantic Git; "to be presented to the million people representing every State and city in the United States."

Diploma Presented to Commander Read

Announcement was made of the award of the Diploma of Honor of the Aerial League of America to Commander A. C. Read, the hero of the transatlantic flight; Flight Lieutenant Stone and the other members of the crew of the NC-4, and Commander R. E. Byrd, who invented the Byrd sextant, by the Awards Committee of the Second Pan-American Aero-

namic Convention

Other prominent officers of the United States Arms Other prominent officers of the United States Arms and Nay were awarded the Leagues diploma, melhiding Major-Nay were awarded the Leagues diploma, melhiding Major-Service overseas during the war, now the U. S. Army repre-sentative on the Aeronantical Commission of the Peac Conference, Rear-Admiral D. S. Kranp, U. S. Naye repre-ference: Rear-Gen. Thresdore, C. Lyster and Lt-Col. I. H. Jones, who were foremost in organizing the Air Medical Service; Col. Halesy Dunwoods, executive officer of the U. S. Air Service overseas; Col. E. Lester Jones, Col. Charles Elliott Warren, Col. B. J. Arnold, Col. Thurman W. Bane, Col. Elliott Warren, Col. B. J., Arnold, Col. Thurman W. Bane, Col. C. J., Edgar, for exceptional exercises rendered to the United C. J., Edgar, for exceptional exercises, and the control of the Col. R. R. Chrustie, Li.-Col. W. G. Kilmer, for exceptional efficiency while in charge of the U. S. Army Aviation centers in France; Col. Charles De F. S. Army Aviation centers in France; Col. Charles De F. S. Army Aviation centers in France; Col. Charles De F. S. Army Rallom Service on France; Maj. J. C. McCoy, Maj. Thomas S. Baldwin and A. Lee Steems, for exceptional efficiency in organizing the U. S. Army Balloon Service (Capt. Charles J. Gidden, for exceptional efficiency in companiing the U. S. Army Balloon Service; Capt. John M. Satterfield, for exceptional efficiency Service; Maj. John M. Satterfield, for exceptional efficiency in connection with the administration of the Air Service in

France during the war.

The Awards Committee had under consideration awards to 100 other high officers of the U. S. Army, Navy and Marine

Corps Air Service. Commercial Aviation Discussed

The future of commercial aviation is six miles above the earth's surface. The hirdmen must get above the storm limits-weather must be eliminated from the commercial aerial log. The "altiplane," the antithesis of the submarine,

will turn the trick.

These were salient points in the address before the second Pan-American Aeronautic Congress by Samuel D. Mott, M. E., an Edison pioneer, charter member of the Aero Club of America, who has just completed a special study of acro-

nauties with the view of future attainment.
"We have read of many men tarrying at Newfoundland for several weeks waiting-waiting for the weather. That trial was a glorious indertaking, our may's expedient was wise, and all honor to the brave men attempting the test. But I submit that waiting indefinitely for ideal weather conditions for long-distance flying over land or sea will not do influents for non-clientance gying over data of sea will not on reasoning that Holland applied to heats to see our of sight leneath the stilled waters of the ocean. I concrive and would bring to your attention the possibilities of the antifluence of the submarine—the altitude plane, or altiplane, as dis-tinguished, from the aeroplane or hydroplane, to go into the stillness of nature above the weather.

"The problem is evidently one of equipment of our planes to function in rarefied air, and protection of navigators against its tenuity; likewise protection of their body warmth and comfort in extremes of temperature. How high we may go no one may know until tested. Personally, I believe it possible to go 15 or 20 miles aloft, if necessary. It is obviously a matter of equipment plus elimbing ability of air-

craft designed for the purpose

What is the object of high flying? Daily experience shows us that high speed and density are incompatible. We know that the surface speed of submarines is about half that of battleships; submerged, it is less, and the greater the depth still less the speed, due, in the first instance, to displacement, which is constant, and in the second place to increasing density, which is progressive. Again we know this when we furnish aircraft with four times the power to go twice as fast, or as we say, the square of the velocity; and the marine engineer knows when he furnishes eight times the power to go twice as fast, or as we say, the cube of the velocity. How well this is illustrated with our swift motorboats designed to run as high out of water as is consistent with stability, and when planes are used their hulls are entirely out of water and in the lighter air above, and when so disposed the highest aquatic speed has been attained. In other words, from the ultimate height of the air to the earth's core pressure is progressive. Thirty-three feet below the ocean's surface the pressure doubles. For every 1,000 feet ascent the pressure diminishes roughly one half pound per square inch. The pressure at two miles high is 9.8 per square inch, at one mile

neessing at two mites high is 300 per silicate inch, at one mite high state of the control of th

velopment is near the surface and wholly confined to the storm limit. Wind strata is of varying temperature. Over the within 1,500 feet of the ground. "Why must there be a storm limit." Because storms and lurricanes do not exist without moisture and heat, and air must have a certain density to hold the moisture due to the most provide the control of evaporation. Hence there can be little or no wind above the

"The unknown factor in the high-altitude problem is thiswill an alti-plane in one-lifth density (eight miles high) with equal push go five times faster or one-lifth faster? The rest The rest is a matter of simple equipment and good construction. In either case the gain is substantial. If the former were true, a voyage between New York and London can be made in around three hours by going eight miles high. If the latter s true the same voyage can be made in about twelve hours' running time, assuming a surface speed of 200 miles per hour, which is practically a question of power,

'In the exhibition in Aeronautical Hall is an engine which explains why we are flying to-day, and why we will fly faster to-morrow. It is a 400 H.P. Curtiss engine weighing 1.7 pounds per H.P. and has driven an aeroplane 160 miles

per hour.

To my mind, it is plain that high altitude will be a determining factor in long-distance flying. This the endurance of the human machine, and limit of life of the power machine—the motor. Greater speed, greater distance, more comfort and less danger—less danger in the quiet environment, less danger because when we double the time to do a risky thing we double the risk incurred. Less gasoline, for a risky tining we domine the risk incurred. Less gasonie, the less weight and expense, for if environment permits to go 100 miles with twice the fuel we formerly need to go 25 miles our economic gain is obviously 100 per cent, because we may then go 100 miles with the amount of fuel we formerly consumed to go 50 miles.



BATTERY OF MACHINES FOR TESTING PHYSICAL PROPERTIES

The shove photograph (reading left to right) shows three tensile testing machines, one which is aparated by hazd; an atternating stress machine; a Brinell herdness testing machine and a scierescope, elso for hardness tests.

and a scierascope, size for bardness tests.

Fig. (...The White Souther Alterestic Stress Meckins—To determine the shifty of a material field of the science of the speciment of the specimen which causes a significant science of the specimen which causes a significant science of the specimen which causes a significant science of the specimen which causes a significant science. Thus a significant science of the specimen causes the stress is reversed. Thus a significant science of the specimen science of the specimen causes the stress is reversed. Thus a significant science of the specimen science of t

various sciences pertaining to the Company's products are co-ordinated under the direction of an administrative mind. The direction of an administrative mind, the direction of an administrative mind, the company of the Company. Every member of the Laloratories organization is impressed with the fact that ideas control markets, with the company of th

For an idea to receive the attention of the Lynite Laboratories staff it must become a formal problem. Before it can become a formal problem, it must pass the critical scrutiny of a Problem Committee, which includes the heads of various sections of the Laboratories, as well as executives of the company itself.

Supposing the idea has passed this first acid text and has become a formal problem. It is now necessary to determine its status, for bothing must be done that existing information bearing on the existing information bearing on the problem in any way, whether resting in the files of the Patent Offices, in technical problem in any any and the resting in the files of the Patent Offices, in technical problem in any and the problem in any and the problem in the discarding to Laboratories, is systematically collected, classified and carefully studied. When this has been done, it is quite possible our truthleasly thrown in the discard. If not, it is quickly labelled "urgent," simportunities and the problem in the discard. If not, it is quickly labelled "urgent," simportunities and the problem in the discard. If not, it is quickly labelled "urgent," simportunities and the problem in the discard. If not, it is quickly labelled "urgent," simportunities which is the problem in the discarding the problem in the discarding the problem in the problem in

sistent with its classification until the happy day when it shall be voted "closed."

Research Division

The Division of Research embraces all investigations in the realm of pure and applied science, and is predicated upon the fact that scientific research implies sound reasoning, the ability to marshall facts, and by correct analysis, both elemental and general, arrive at correct commendations of the property of the pr

clusions. The division itself comprises the various sections listed above, and works in close co-operation with the Development sections.

Metallurgical Section

The work of this section includes all eneral metallurgical research not included in the special research field. It consists of a broad study of alloy development and in particular a field investigation of melting practice and improved metallurgical methods.

Chemical Laboratories

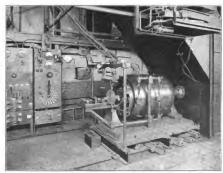
There are two distinct phases of the work of the Chemistry Section, namely: test and research. The exact control necessary to successful operation and research is rendered possible by the chemsomel and equipment necessary for the complete analysis of aluminum alloys, hourses, and other metals. The everyday question of corrosion and the action of alloys under new conditions, such as hear treating, are answered here, as well hear treating, are answered here, as well search.

It has full facilities for small-scale research and includes in its equipment everything in the way of furnaces, hot plates, glass blowers' bench, balance room, fume cabinet, etc.

The research activities are best seen in the special experimental and development laloratory. This laboratory is the stepping stone from the test tube and beaker to plant production. It is an admirable workshop, fully equipped with motors, tools, and specially constructed apparatus designed to meet the needs of industrial research work.

Metallography Section

The rapid advance in the arts of producing, fabrication and alloying of metals in the last twenty years has been very



WEIGHING SYSTEM OF DYNAMOMETERS

This system was specially designed and built for Lynite Laboretories. It embodies a multiplying lover, so that the scale reads the pounds torque at a Shinch sem and makes here-power
actuations very easy. Must of the belif-edge between the scales with, and self-slighting
actuations very easy. Must of the belif-edge have been dispensed with, and self-slighting
weight be placed upon the halfe edge on the dynamometer field frame it will show a deflection
on the scale.



A corner of the Laboratories' own machine shop

lagedy due to the development of the science of metallography. Birling defined, metallography is the study of the "consistence" of metals. Just as the doctor investigates a wound in the human body the metallographity goes beneath the surface of metals, examines their structure and determines their "constitutional characteristic." Many methods are and determines their "constitutional characteristic." Many methods are printed to the property of the property of

metallographic camera for taking microscopic photographis; a large camera for photographing objects at their actual size; electric furnaces and a special potention-eter for heat treating and cooling curve time of the coefficient of thermal expansion and the thermal conductivity of alloys.

Physics Laboratory

Appreciating the necessity for physics research to round out the scientific investigations of the Laboratories, a sepa-



Here is the large wind tunnel connected with the 400 H.P. dynamometer in which a breeze of 40 miles an hour can be blown past the engine. On the block and ready for test is shown a six-cylinder all-atuminatum engine

rate section has been created to study the various problems from this point of view. The equipment consists of voltmeters, potentiometers, ammeters, condensers, galvanometers, resistance standards, Whentelescopes, and all necessary apparatus for making measurements. The work of this section is essentially research in its character, and therefore calls for special apneeded. In order to maintain close contact with foundry practice, the organization includes an industrial physicist.

The Tests Section

The Tests Section comprises a test bar foundry and a physical testing laboratory. The work of the foundry consists in the production of test bars, by which the properties of the new alloys may be studied, and also in study of the effect of variation in melting and casting practice. Two oil-fired crucible furnaces are used for melting, while two gas-fired furnaces, one for high temperatures and one



FIg. 3—CHARPY SINGLE-BLOW IMPACT

The use of this machine in the non-ferrous industry is new. A square har about '\(\frac{1}{2}\)' on ever a 2' square har about '\(\frac{1}{2}\)' on ever a 2'' square. The failing pendulum fractures the test har in one blow. The energy absorbed is measured by the difference be made the energy remaining after the blow, which is indicated by the height to which the pendulum rises. It delivers a blow of 200 ft, the or the equivalent of a weight of 60 fth, failing.

for low temperatures, are available for

experimental heat treatment. The work of the physical testing laboratory is both routine and special, activity with which it is concerned. Under route tests would be classed the usual tension tests, by which the yield point is stress and elongation. Other properties which may be determined are the reduction of area, elastic and proportions which have a very important hearing on the use to which the alloy may be put. There are no less than four tensile testing the properties of the properties o

ample the 50,000-pound machine. This machine will take a standard test bar of a material having a maximum stress of as high as 250,000 pounds per square inch. The 200,000-pound testing machine is used in making tests on large aluminum castings.

There are two standard ways of measring hardness. One is by microscopic examination of the depth to which a hardened steel ball is forced by pressure upon the alloy under test. This is the Brinell test. Here a ten mm, steel ball is forced into the metal by hydraulic pressure. For soft metals, a pressure of 500 kg, is used, while for hard metals 3,000 kg, is necessary. The diameter of the indentation is measured by means of a microscope from which is calculated the Briucll hardness number. This value the Brucil hardness number. Ins value is read directly from tables, and represents the load in kg. per square mm. of spherical area of the indentation. The other method of determining hardness is other method of determining hardness is by means of the rebound of a small ham-mer. The instrument used is known as the scleroscope. It consists of a ham-mer which falls from a fixed distance inside a glass tube. The height of the rebound of this hammer gives the scleroscope hardness.

Another physical test, not as common as those mentioned but of considerable importance in certain cases, is the transverse test. A standard bar is supported at two points, say 12 inches apart, and a load applied in the center. The testing machine weighs the load applied, and measures the deflection of the test bar. Compression, or the ability of a ma-terial to resist "push," is also measured

the tension testing machines.

The special tests include fatigue and impact tests, as well as tests on fabriimpact tests, as well as tests on fabricated parts. In the impact field the Stanton Repeated Blow Impact Machine is of porticular interest. It is an English machine, and very popular with British engineers. The test tells how the material actual operation. Fig. 2.

The Charpy Single Blow Impact Machine is of French inheritance. A falling pendulum fractures the test bar in one blow. Fig. 3. This machine has wide to non-ferrous metals is radically new and of considerable significance.

The White-Souther Alternating Stress

The White-Souther Alternating Stress Machine shows how a material may re-sist "fatigue," for metals seem to tire just as human beings do. Fig. 1.

The Dynamics Laboratory

The Dynamics Laboratory occupies a room about 110 feet long and 25 feet wide. Its work consists of theoretical investigations of internal combustion investigations of internal combustion engines, and in particular, sudy of such parts as use aluminum alloys. It could tall tests for establishing principles used in design, and includes routine tests used in design, and includes routine tests and the general testing of gear wheels and rear axles. The principal equipment consists of three Sprazue dynamometers:

One rared at 400 H.P. at 1400 r.p.m.
One rated at 200 H.P. at 130 r.p.m.
In installing this equipment, the customary bed plate was not used, but incomary bed plate was not used, but in-

tomary bed plate was not used, but in-stead a special channel construction was embodied in the concrete floor to which the dynamometers could be bolted. gives the equivalent of a bed plate ex-tending the entire length of the room. The advantages of this are apparent. The dynamometers can easily be moved around to any position ou this space, and two or more can be connected in tandem,



VIEW OF DYNAMIC LABORATORY wing three Sprague Electric Dynemometers, Alden Absorption Dynamometer for rear as a, and generators. Note the channel construction in the floor, giving a bed plate extendi-length of the laboratory, and also the amount of floor space available due to the averbe location of apparatus and devices

which makes it possible to test an engine whose power output is greatly in excess of the capacity of any one individual

of the capacity of any one individual dynamometer.

Another advantage of embodying the bedplate in the floor is that the length of the engine or other piece of appa-ratus which is being tested is not limited by the length of the bedplate. This is especially advantageous in a laboratory in which a great variety of work must be done, and where the testing is not limited to engines of one size.

The weighing system of the dynamo-

meters was especially built for the Lynite

Laboratories. It embodies a multiplying lever, so that the scale reads the pounds torque at a 63-inch arm. This makes horse-power calculations very easy. In this weighing system, most of the knife edges have been dispensed with, and selfeoges nave been dispensed with, and self-aligning ball bearings used in their stead. The whole system is so delicate that if a quarter-pound weight be placed upon the knife edge ou the dynamometer field frame, it will show a deflection on the scale.

The revolution counting device was also especially built for this Laboratory. It consists of two Veeder counters con-

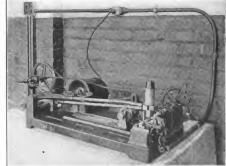


Fig. 2-STANTON REPEATED BLOW IMPACT MACHINE This methins test the ability of material to without repeated sheet. The specimes is a dissense is sent the ability of material to without repeated sheet. The specimes is a dissense is sent to the specimes is a dissense in the second sheet. The specimes is dissense is dropped upon the centre of the bar, which ratates so that the second sheet is dissense in the second sheet is sent to be second sheet in the second sheet is sent to be second sheet in the second sh



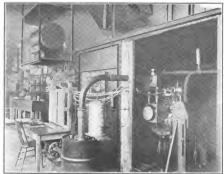
Testing laboratory of the Chemistry Section, showing balance room, fume cabinet, etc.

nected through a year box to the dynamometer shaft. These counters are provided with a jaw clutch which can be thrown in and out electrically. The wiring is so arranged that when one counter is thrown in, the other one is thrown the endings can therefore be taken at a count, and the counter of the counter of the counter of the count.

The flexible couplings were all built in the Laboratories own shops, and consist of two flanges, one connected to the engine, and one to the dynamometer, and an intermediate piece connected through leather discs to each of the other two flanges. So that the leather may not be called upon to carry the weight of the intermediate piece, this piece is supported on spherical protections centered.

in the discs connected to the engine and the dynamometer. The leather, therefore, transmits only the torque. Several of these couplings are made of Lynite cast-

ings.
In connection with the 400 H.P. dynamometer, there is installed a wind tunned, so that the engine under test may the control of the separate cylinders to a manifold. The beaver can bloom out the estatust got the separate cylinders to a manifold. The beaver can bloom out the estatust quite be observed through windows. When making long endurance tests of engines, it is also desirable to use this wind tunned to the control of the cont



This photograph shows the complete act-up for measuring power, gasoline and eir consumption, es well as for determining temperature in each eshaust pipe end pressure in the inlet and exhaust pipe for each cylinder

The fuel is contained in a tank momnted on a delicate scale and fed to the engine by gravity. Weighings are made over as long a period as possible, rarely less than two minutes, depending somewhat, of course, upon the size of the engine and the speed at which it is running. At

least three readings are taken. The air consumption of engines can be measured by the use of Venturi meters. The laboratory possesses various sizes of such meters, and the necessary expanients. As the laboratory possesses various sizes of such meters, and the necessary expanients. Having measured the air and the fuel, the mixture ratio of course can be calculated, and their measurement is of so fittle importance in studying the performance of an internal combustion engine. The air measurement of combustion metric efficiency determining the voltaments of the control of t

metric, etheency.

On its way to the engine, the cooling water passes through a Venturi meter, which measures the rate in pounds per minute. The temperature of the ingoing water is kept constant by the use of a thermostat. Both in-going and out-going cooling water temperatures are measured with mercurial thermometers.

The heat loss in exhausts can be measured.

The heat loss in exhausts can be measured in a calorimeter. In making this measurement, the exhaust gas is passed through water, and the increase in temperature of the water as well as the quantity is noted. This apparatus must generally be built to accommodate the sare of the engine. All the parts, however, entering into its construction are rathory of the apparatus of the laboratory of the construction are rather than the apparatus of the laboratory of the parts however.

The work of the dynamics laloratory is not limited to making tests of internal combustion engines. Gears, rear a combustion engines. Gears, rear done in this department. For this reason the laboratory is also equipped with the Alden absorption dynamometer. This is for use in absorbing power at extremely low speeds, such as is necessitated in making tests of rear axles.

Since it is impossible to purchase direct urrent, it is necessary to make it. For this purpose two motor generator sets are employed. One at 10 KM; 20 volt 10 Ca. comployed. One at 10 KM; 20 volt 10 Ca. comployed. One at 10 KM; 20 volt 10 Ca. comployed one at 10 KM; 20 volt 10 Ca. comployed with the set of the set of

reduce the voltage on your generator. The arrangement of the electrical on the control of the property of the control of the c



Front view "Jupiter" engine

nent of the inlet pipes, which form part of a very interesting induction system. As will be seen, three carburctors are bolted to the crankess cover, which also forms one side of the induction chamber.

chamber. This induction chamber is annular, and into it is fitted a spiral fluted aluminum casting which soits as a gas distributor to the epinders. Each of the three carbureters supplies three cylinders to the control of the contr

arrangement has proved tirelf a success. Two links and two exhaust valves are fitted per cylinder, operated by two cam rings, each with four cams running at once-ight engine greed, through tappets mounted in the front 27772172, Bennat magnetos driven by bevel garring from the crankshaft and mounted on the back cover of the erankshaft and mounted on the back cover of the erankshaft is position, that the contact because the contact have been a superior of the induction of the charkes and the contact because the contact have been appeared to the charkes and the contact have been appeared to the charkes and the contact have been appeared to the charkes and the contact have been appeared to the charkes and the contact have been appeared to the charkes and the contact have been appeared to the charkes and the contact have been appeared to the charkes and the charkes are charked to the charkes and the charkes and the charkes and the charkes are charked to the charkes and the charkes and the charkes and the charkes are charked to the charkes are charked to the charkes are charked to the charked to

breakers are readily accessible.

With the exception of the connecting-rod assembly, the engine is, in essentials, similar to the "Mercury". A master connecting rod with master rod is white metal fined, all other bearings in the engine see of the roller type. It is hardly necessary to point out that the crankshaft in the "Jupiter" engine is of the single throw type.

"Justice" engine is of the single throw type. It is difficult to any much by way of general review of engines that have not long been in the of proving their mettle in continuous service. The induction system of the "Justice" engine and the representation of the three properties of that the engines have brains behind them, and that precedent and tradition ser not being followed bindly.

Locating Engine Troubles with the

The geophone, a listening instrument invented by the French during the war to detect enemy sapping and underground mining operations and for the location of enemy artillery, is capable of a number of interesting peace-time applications, according to the Bureau of Mines. These include the locating of miners who have been entombed after an accident, for bringing approaching tunnel headings to

gether accurately, preventing accidents from explosion when breaking through

and for locating underground fires and knocks in the valves and cylinders of

automobile engines. When used for this

last purpose the instrument, which is small

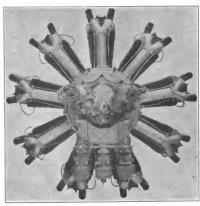
and essentially a seismograph, should be

mounted on a short iron rod that can be easily inserted in and around the machinery that is being tested.

The instrument consists of an iron ring of about 3/s-in. diameter with a lead disk suspended in its center. A single both spassing through two mica disks, one of which covers the top and the other the lead disk in the proper position. Two lrass cap pieces, the upper one having an opening in its center to which is fastened a rubber tube, leading to a strike in service are piece, complete the instrument. Both after the cap pieces to their ior micro place.

If the instrument which in reality is nothing but a lead weight suspended between two mica disks cutting across a small air-tight box, is placed on the ground, the energy due to any pounding or digging that may be going on in the vicinity is transmitted as a wave motion to the earth, and these earth waves shake the case. The lead weight because of its mass and also because it is suspended between the mica disks remains comparatively motionless. Thus the relative mocase and the lead weight, the result being that the air in the instrument is compressed and rarefied and this in turn is carried to the ear drum through the rubber tube connecting the instrument with the ear piece.

Two instruments, one for each ear, are ordinarily employed, and by moving them a point can be found where the sound will be of the same apparent intensity in both ears, thus enabling the direction from which the sound is coming to be determined accurately.



Rear view "Jupiter" engine

NOTES ON CEMENTED SEAMS AND RUBBER CEMENTS WITH REFERENCE TO BALLOON CONSTRUCTION

By J. D. Edwards, Associate Chemist and I. L. Moore, Assistant Chemist, Bureau of Standards

I. Introduction

UBBER cemen finds many uses in the industry, particularly for the fabrication and repair of rubber goods. Nowhere perhaps, is a knowledge of the principles undown, which requires the cementing together of the different pieces of fabric to build up the gores and panels which form the envelope, and for the attachment of appendages, and the cementing of patches. In addition to being gastapht these seams must also bear considerable mechanical load, and although they may be lutther strengthened by stielning. it is of some importance that the cemented joint shall be as strong as possible because any slipping will throw an undue load on the stitching. Furthermore, any loosening or slipping of the seam will cause excessive leakage of the balloon gas.

The Bureau's attention was called to this matter by some The Bureau's attention was called to this matter by some experiments of the Goodrich and Goodyear rubber companies on cementing aluminum coated fabrics together. The unexpected result of these tests was that when the aluminum coating was buffed off, presumably to give a better holding surface for the cement, the cemented joint made thereon was inferior in strength to joints made without any pre-liminary treatment of the surface.

In endeavoring to arrive at the proper explanation for this fact we have made mimorous tests on seams and cements. The object has been to establish the principles underlying

MICROSECTIONS OF SEAMS ement Rubber Rubber Rubbel cement good seam construction and to develop suitable methods for testing the seams and cements under investigation.

II. Characteristics of Seas

In constructing a balloon envelope there are a variety of surfaces that may have to be cemented together and, as we have already noted, the character of the surfaces has an important effect on the strength of the cemented seams. For determining the strength of seams which were to be investigated, the following test was adopted as a standard:

gated, the following test was adopted as a standard:
The seam was prepared by first washing with benzene or
gasoline the surface to be cemented, and then applying
was allowed to dry somewhat before applying the second
coat. Before the second coat was fully dry, the surfaces
were lapped and pressed firmly together by rolling with a
steel roller; and the width of lap used was 0.5 inch. These
scams were allowed to set for at least 24 hours before testscains were allowed to set for at least 24 hours before test-ing. Strips one inch wide were then cut from the larger pieces and suspended in a constant temperature air bath under a tension of I kilogram. The time required for the seam to break was taken as a measure of its strength. (1), Effect of Character of Surface-Seams were con-structed of different kinds of balloon fabries to show the effect of differences in the character of the surfaces on the

effect of differences in the character of the surfaces on the holding power of the seam. The same sample of high-grade balloon cement was used in all of these seams. They may be described as follows: (1) Citoh cemented to cloth (CC), (2) rubher cemented to cloth (RC), (3) rubber comented to rubber (RA), (4) rubber cemented to a aluminized surface (RA) and (5) aluminized surface cemented to an aluminized surface (AA). These seams were cemented to an aluminized surface (AA). These seams were subjected to the test described above after premitting them to set for a suitable time. Table 1 gives the average of a number of determinations of the time required to break under a tension of 1 kilogram per incli of width at 55°C. Figures 6 and 7 which give the variation in the times required for the seams to break under different loads and at different temperatures, show raphically the relative strengths of some of these seams. They rank clearly in the following order, the strongest being placed first:

Aluminized surface cemented to aluminized surface. Rubber surface cemented to aluminized surface.

Rubber surface cemented to rubber surface. Cloth surface cemented to rubber surface. Cloth surface cemented to cloth surface.

This order and practically the same relative strengths were found to hold both when the seams were tested within 24 hours after they were made and also several weeks later. It

RELATIVE STRENGTH OF SEAMS MADE BY CEMENTING DIFFERENT SURFACES TOGETHER

Scam No.	· Description	Average time required to break at 55° C under a constant load of 1 kilo- gram per inch.
1	Cloth cemented to cloth	7 minutes
3	Cloth cemented to subber .	10 minutes
3	Rubber cemented to rubber	30 minutes
4	Rubber cemented to alumi-	
	nized surface	100 minutes
5	Aluminized surface cement- ed to aluminized surface	400 minutes

apparent from Figs. 6 and 7 that the relative strengths is apparent from Figs, 0 and 7 that the relative strengths will vary somewhat with the conditions of test; this point will be disclosed in a succeeding section.

2. Essentials of good construction.—The load on a comented lap in an inflated balloon is almost entirely a shear-

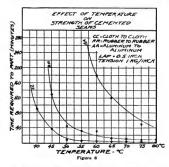
ing stress caused by the surface tension which results from the pressure of the gas in the envelope, and the weight on the suspension. This condition has been duplicated in the tests made by subjecting the test pieces to direct tension along their length, thus making the stress in the cement film their length, thus making the stress in the central shearing one. Since there is no tensile force tending to shearing one. pull the seams apart perpendicular to the fabric, the film having the greatest shearing strength is the most desirable.

For this reason as thin a coat of cement as is feasible to For this reason as thin a coat of cement as is feasible to apply and insure complete adhesion to both surfaces is the quality of the cement may defeat this purpose. If the cement is thick and lumpy great difficulty is experienced in getting a smooth coat and in securing complete wetting of the surface. If the surface is rough, the film is not maintained uniformly thin, even when spread smoothly. Rubber is com-paratively inelastic and suffers shearing deformation easily. This deformation is particularly large in thick films and the load is consequently thrown onto the thin places, which give way under the unequal distribution of the load. The stress is then carried by the next thinnest place and so on until the lap slips apart. A smooth surface is also desirable bebridges with a film and the consequent poor adhesion may result in the finished lap and a considerable portion of the

sult in the hinshed lap and a considerable portion of the cemented area and bearing its share of the load.

of importance. Good adhesion is not secured if the surface is not setted thoroughly by the cement. This purpose is defeated in the case of rough surfaces, as pointed out above. The presence of greate or dust on the surface also above. They presence of greate or dust on the surface also prevents the cement from adhering properly. For this reason, seams which receive a preliminary washing with benzene show somewhat higher strength than when the washing is show somewhat higher strength than when the washing is omitted. Even in the case of very smooth, clean surfaces, however, adhesion may not be perfect because the centent may be separated from the surface by a thin lim of air which will be detrimental to the strength of the scann. A study of the microsection, Figs. 1, 2, 3, 4 and 5, demonstrates the validity of these assumptions regarding the factors contributing to strength. The alumnium to alumination of the scanning of the strength.

num seam (Fig. 1), which is the strongest of any experimented with, shows a remarkably smooth thin film in which adherence to the aluminized surface is practically perfect, and which is free from thick places, bare spots and other imper-fections. At the other end of the scale is the cloth to cloth seam, which presents a vastly different appearance. The cement film is very irregular and varies widely in thickness and closeness of adhesion from place to place. The other types of construction show characteristics ranging successively between these two extremes, none being so markedly poor as



the cloth to cloth and none so good as the aluminum to aluminum seam.

To be sure of a strong seam, therefore, one must have a smooth, clean surface which will wet easily with the cement. The cement must be applied smoothly and evenly and the lap

In extend must be appried smoothly and the range measure range pressed firmly together before too dry.

(3) Cements—In addition to the charactern of the surfaces etemented together, the kind of cement used also has a considerable effect on the strength of the same produced to the last analysis the determining feature for as pointed out above, the seam fails in shear and the elastic properties of the cement determine the amount of shear even though the nniformity, adhesion and thickness of film modify the result. The best grades of balloon cement are

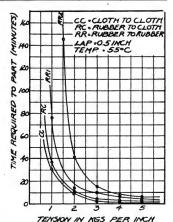


Figure 7-Relation of load to holding power of cemented see

made by dissolving new rubber in benzene and thoroughly kneading the mass in a dough mixer. The finished cement must be smooth, free from lumps and thin enough to spread easily and smoothly on the surface to which it is to be

applied. Tests were made with two grades of commercial balloon cement, one grade of self vulcanizing tire cement, and one rubber cement made up by dissolving old raw rubber in berecene and mixing by hand. Seams were made with these cements by cementing two rubberized surfaces together; the results are comparable with the seam described in Table 1 as rubber to rubber (RR). The results of tests on these four cements are given in Table 2.

RELATIVE HOLDING POWERS OF CEMENTS

Seam No.	Cement	Average time required to break at 55°C; lap = 0.5 inch; tension = 1 kg. inch
1	Old raw rubber dissolved in benzine; mixed by hand	3 minutes
2	Balloon Cement; Manufac-	9 minutes
:3	Balloon Cement; Manufac-	30 minutes
4	Self vulcanizing tire cement	160 minutes

Itl. Testing Methods

The conditions of test have an important effect on the apparent strength of the seam, as would of course be ex-It is important therefore, that the conditions that effect the apparent strength shall duplicate, as far as possible, the conditions of service. For example, the tests were made under constant tension because the seams are under constant tension in a balloon. A load of 1 kilogram was used because it is at least of the same magnitude as the loads the seams may bear in service. Temperatures above ordinary air temperatures were used because of the increase in temperature of the balloon fabric when exposed to sunlight. In fact most

seam failures occur when the fabric becomes "over-heated The effects of variations in the load, temperature of fabric and width of lap were found by suitable tests in order that the conditions of test might be intelligently selected. Effect of Temperature upon Strength of Seam.—As pointed

Effect of Temperature upon Strength of Seam.—As pointed out above, the failure of seams usually occurs when the laps have become overheated. In kite failulous with outside coarbave for the properties of the seam of the sea

Scans were usude up in the usual manner and placed in a constant temperature air hash under a tension of 1 kilogram per inch of width, and the time required for the degree intervals was determined. Figure 6 shows graphically the relation between the temperature and time of break for three different types of seams. These all have the same general shape and all show a critical temperature the same general shape and all show a critical temperature and time of break for three different types of seams. These all have the same general shape and all show a critical temperature the same graphic places are shaped as the same properation of the temperature and time of the same properation of the temperature at the strength increasing rapidly as the temperature decreases. In this region there is preumably a transition from vicious to plastic there is the same properation of the temperature at the same time of the same properation of the temperature attained, and the lap parts very quickly. This transition point is not clearly marked, however, and is observed by variations in the strength of adherence case where the aliminized surfaces are comented together, the time of breaking is more nearly a linear function than with the other types, which indicates very close adhesion starts is reached the time required to part is still quite high.

the time of Ireaking is more nearly a linear function than with the other types, which indicates very close afflesion with the other types. The indicates the constant of the control of t

Table 3
TEST OF SEAMS AT ROOM TEMPERATURE,
ABOUT 25° C

Seam No.	Construction	Time required to part Lap 0.5 inch, tension 29 lbs, per inch			
		1st Test 2nd Test Piece Piece			
11	Rubber to aluminized sur- face; washed with benzine	Over 68 hours	Over 50 hours		
1	Rubber to aluminized sur- face; untreated	13 hours	Over 50 hours		
J	Cloth to cloth; subber and aluminum surface buffed off with wire brush	48 minutes	71 min.		

Note:—Seam I on first test piece showed a slight imperfection at the center of the lap where adhesion was not complete.

complete, complete, and a cemented lap may average about 1.5 kilogram (3.2 pounds) per linear inch. Tennion.—In practice the load on a cemented lap may average about 1.5 kilogram (3.2 pounds) per linear inch. Choon as a fair value. Tests were made, however, to determine the effect of different tensions on the apparent strength of seams. Figure 7 shows the variations of breaking time with loads of from 1 to 5 kilograms per inch at 55°C. A study of these curves shows that for loads above 2 kilograms per inch there is little difference in the time required to the study of the curves shows that for loads above 2 kilograms per inch there is little difference in the time required to the study of the curves thought the study of the curves the study of the study

Width of lap .- It is obvious that increased strength can

be obtained by increasing the width of Inp. This increase in strength is not a linear function, but increases roughly as the cube of the width of Iap at small widths and even faster with wider Iaps. This is to be expected since the slipping apart is a gradual process dependent on the giving way one after another of the infinitesimal points of contact and when we have a wide Iap we not only have more points of adherion, but less virres is also put on each remove of the property of the property of the property of the property of the lighter loads, the decrease bearing much the same relation to the Iap as that shown in our load curves (see figure?). Figure 8 shows the relation between Iap and

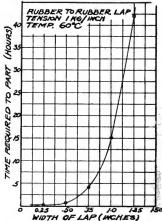


Figure 8-Effect of width of lap on strength of cemented seams

time required to part for five widths of lap. These tests were made at 55°C, with the seams under a tension of 1 kiloram per inch.

kologram, per inch.

(4) Coats of Cement.—The evidence on the effect of varying the number of coats of cement is conflicting. This is to be expected since definite amounts of rubber cannot be spread when the material is merch furshed on by hand, surface to give a continuous fin all over it. Once this is done the addition of more of the material only serves to weaken the seam, since it allows more sherring deformation to take place when the boad is applied. For ficient. For aluminized fashries one coat, if properly applied frequently give quite as good a holding power as two coats; and certainly better than three.

IV. Summary

We have shown by tests and the examination of microscitonic of comented seams what the escentials of good seam construction are. A good seam requires, first of all, a good center. Next the surfaces to be cemented should be smooth and clean and easily wetted by the cement. The ness; two coats are usually sufficient. The strength of the seam will be profoundly influenced by the character of the seam will be profoundly influenced by the character of the cemented surfaces. The variations in the strength with chance in temperature, load and width of lap have been and the significance of different conditions of test is discussed.

DINERS TRAVEL VIA AIR ROUTE

A NEW era has been inaugurated in the aeronautic world in the wonderful performance of the first dirigible balloon built for the United States Army balloon built for the United States Army during the recent war—the A-d. This big airship, of the type [amiliarly known as "Dilmp," with Army Gvilian Flot James Shade at the wheel has just made the trip from the Wingfoot Lake Air Station, near Akron, Ohio, to Cleveland, landing on the roof of the Stater Hotel, discharging two passengers and immediately returning to its hangars 30 miles distant. This is the first time in the history of aeronautics in America that any type of aircraft has been brought to a quick and convenient stop in the heart of a large city for the purpose of landing passengers.

The occasion was the meeting and dinner of the Cleveland Section of the Society of Automotive Engineers at this hotel, at which Ralph H. Upson, chief aero engineer of the Goodyear Tire & Rubber Company, and Major C. H. Ma-



The successful landing on the roof of Hotel

ranville, commander of the Army Air-craft Detachment at Akron and Wing-

cratt Detachment at Akron and Wing-foot Lake, were speakers. Upson, who is the world's champion balloonist, having won the last great In-ternational Balloon Race at Paris, France, with R. A. D. Preston acting as aide, in a wonderful 500-mile flight, conceived the idea of making the trip in a dirigible, and with the full co-operation of the army officers of the dirigible school at Akron, who arranged all details, was able to carry out the project.

Glenn L. Martin, the noted inventor

and pioneer manufacturer of aeroplanes, and one of the country's noted aviators, was the first to greet and congratulate the two passengers as they stepped from the car. To the thousands of interested spec-

tators of this history-making event the conclusion was inevitable that commercial dirigible navigation is almost upon us.

The performance was not staged as a

"stunt," but to show the progress that has been made in the development of dirigibles and the skill with which diffi-cult landings can be made by experienced

cult landengs can be made by experienced with the control of the c



Raiph H. Upson, chief aero engine





The Army dirigible A-4



The AIRCRAFT TRADE REVIEW



Propellers for NC Planes Were Two-day Rush Job

Baltimore, Md .- An example of the Baltimore, Ard.—An example of the rapid work and efficient service of the American Propeller Company of Balti-more is afforded by the handling of the contract for the propellers for use on the NC squadron.

At the American Propeller Company's works one Saturday afternoon shortly before the start of the first stage of the flight, while the force was getting ready to quit and enjoy the holiday, when washington rang in on long distance to the control of the start of the flight were demanded in the shortest possible time. Lieutenant George S. Murray, of the Bureau of Steam Navigation, U. S. N., which had the matter in charge, was already on his way to all the start of the sta At the American Propeller Company's At 7 p. m. Sunday the 12 propellers were made and varnished. A day was required for the varnish to dry, and on Monday night in a special baggage car, with Lieutream Murray beside them, the propellers started for Boston; on arrival there early Monday morning by special trucks they were taken to the fast torpedoboat destroyer Edwards, waiting with steam up; the hatches were found too small to take the propellers below, and they were take the propeliers below, and they were lashed on deck and the boat, under forced draft, started for Trepassey bay. These Baltimore-made propellers were delivered at this far-off Newfoundland point on the afternoon of Wednesday, May 14, Jour days from the time of their

being ordered.

The propellers were of the ordinary

two-blade type, 10 feet in diameter, and were for the three tractor engines of each plane to pull a gross load of 28,000 pounds at an expected speed of 85 miles hour.

The company received the emcomium of naval officials for the efficient handling of the contract

Albuquerque School Moves to Wichita

Wichita, Kans.—The company which organized the aviation school at Albuquerque, N. M., has organized a \$25,001 corporation at Wichita. Their equipment is being moved to this city because the high alitude at Albuquerque made it unsafe for instruction purposes. The Board of Commerce of Wichita is

co-operating with the company in the establishment of a first-class landing field under government specifications. Reguunder government specincations. Acqui-lar passenger trips between Wichita, Kan-sas City and Tulsa, or any point within 250 miles' radius will be established where the demand warrants. The school's equipment consists of five aero-planes and instruction in flying, wireless, astronomy and meteorology will be given by the faculty.

Air Travel Firm Formed

An acroplane transportation company has been organized to link up Detroit and nas ocen organized to ink up Detroit and Cleveland by direct air route over the Detroit River and Lake Erie. Daily trips, weather permitting, will be made each way, the planes leaving at 9 o'clock in the morning.

The commercial enterprise has been undertaken by the Universal Aviation Company, and is backed by many prominent

Detroit and Cleveland automobile manufacturers. H. M. Leland, of Detroit, who was former president of the Cadillac Motor Car Company and now president of the Lincoln Motor Company, and E. E. Allyne, president of the Aluminum Cast-ing Corporation of Cleveland, are heading the project as president and first vice-president, respectively, H. D. McCulpresident, respectively. H. D. McCul-lough is secretary and treasurer of the

lough its secretary and treasurer of the company.

John T. Patterson, the general manager of the company, has come here to engage additional pilots and to arrange of the shipping of the sareplanes. He made, if possible on Jungary and the same of the shipping of the sareplanes. He made, if possible on Jungary and the same of the

Toledo around the southern end of Lake Eric is necessary.

Two aviation fields with hangars and buildings have been established in Detroit. One is opposite Belle Isle, just east of the bridge, and another at Morrow of the Bridge and the Bridge and the Bridge and the Bridge Bell is chosen to the second of the Bridge Bell in the Bridge as well as another at the flying field in Cleveland

Dixie Flying School Organized

Birmingham, Ala.—The first Civilian Flying School to be organized on a large scale in the South since cessation of hostilities has been completed here with

Plying Corporation. Under the terms of the charter the company will conduct a large school for civilians and will include in the villans and will include in the course a complete ground school of instruction. Standard Army Training planes will be used in the training. The company will in addition handle an extensive line of aeroplanes, including a full stock of parts, and will keep open at Birmingham at all times a service field for any planes that might come that way.

The company is the largest, both from a point of financial backing and actual holdings of fields, planes and all equipment for training yet organized in the United States, it is believed. Scores of men have already been employed in completing the preliminaries and by the opening some thirty days from now the Dixie Flying Corporation will employ more than 100 persons, including instructors, mechanics, clerical, field officers and other personnel such as salesmen, stock foremen



Exhibit of the American Propeller Co. on the Steel Pier at Atlantic City during the Pan-American Aeronautic Convention



Chicago-Cleveland Air Route Shows High Efficiency and Reliability

The Chicago-Cleveland Air Mail Serv-

The Chicago-Cleveland Air Mail Service during its first half month has made a daily 100 per cent. performance except two half trips, May 21, when the field at Bryan, Ohio, was so flooded that the planes could not rise from the 1050. total of 10,725 was run, making a performance of 971, per cent. A grand total of 408,560 letters were carried in the first half month of this service. In the operation of the Cleveland-Chicago Arr Mail the greatest forward step in that since May 21 the daily trips in each direction are about 325 miles non-stop. direction are about 325 miles non-stop. Twenty such non-stop trips were made without motor trouble of any kind, and with a single mishap in the nature of a with a single mishap in the nature of a fire in the pilot's cockpit of a plane operated by Pilot Frank McCusker, re-sulting in the death of list pilot. Dis-ception of the pilot of the pilot carrying the mail since the service was established, May 15, 1918. The remarkable long distance, non-stop flights on the Chicago-Cleveland route are being performed by the De Haviland planes strengthened for cross-

country mail carrying and equipped with low compression Liberty motors. The best time made on any trip between Chicago and Cleveland was 2 hours and 42 minutes for 325 miles, and the longest trip was 4 hours, due to a bad headwind. trip was 4 hours, due to a bad headwind. The average speed for the half month was 98½ miles per hour, and the average gas consumption was 23½ gallons per hour. The mail leaves Cleveland and Chicago at 9.30 o'clock each morning, including Sundays, and arrives at its destination susually between 12 and 1 o'clock in the afternoon.

Aerial Mail Service for the Philippine Islands

Among the plans for aerial mail services with which forward-looking people are busy in various parts of the world, one which has promise of realization within a reasonable time because of the comparative simplicity of the practical problems to be solved is that of an aeroplane mail connecting important points in the Philip-Manila to Iloilo. The distance in each case is well within the limits of a nonstop aeroplane flight, and is yet sufficiently great to make the saving of time over

that of the steamship mail routes a controlling factor in the choice. While nothing very definite seems to have been done as yet toward putting such mail routes into existence, the Director of Posts for the islands, Jose Topacio, is considering various recommendations from aeroplane and flying experts, and recommendations on the subject to the

Philippine Legislature may follow. Concrete proposals for a mail service to various points within flying radius of Manila have also, according to the Manila press, been presented to the authorities by H. J. Folsom, lately an officer in the United States Army Air Service, and an instructor at various flying fields during the war. A Manila paper quotes Folsom

as follows:
"It is in the lightly populated regions and in island commerce that we all look and in island commerce that we all look forward to the most rapid development in commercial flying. There are in China and in other parts of the Orient many important commercial centers which cannot be linked with neighboring

centers by rail owing to the mountains, jungle or water. In such inland regions rail lines depend largely on the business continuously along the line for their sup-port, and a long barren stretch can often render a rail line inadvisable, even though the terminals might offer large induce-ments. Railroading under such physical conditions is very expensive, but an air service does not depend on interterminal business. Therefore airmen generally believe that air routes are the solution of many problems similar to that of island communication in the Philippines.

Salvage Motors and Aeroplanes to be Sold to Public

Those contemplating the purchase of a Those contemplating the purchase of a Government aeroplane or motor, can write the Salvage and Sales Branch, Air Service, 6th and "B" Streets, Washington, D. C., and have their name entered on the life to be advised when the corosing the contemplation of the corosing the salvage of the corosing the coro on the list to be advised when the oppor-tunity arrives for them to make a pur-chase. Detailed information furnished on request.



One of the Curties J.N.4-H Mail Acceptance with a 150 H.P. Hispano-Suiza engine. The mail compartment is situated at the conter of gravity. The markings on the side of the tusedage indicate that it has a maximum carrylog weight of 3,500 pounds



NAVAL and MILITARY AEDONAUTICS A



Commander Towers Ordered to Duty Col. Fuller Presents \$30,000,000 Esti-

Washington, June 6.—Commander John H. Towers, Flight Commander of the Navy Transatlantic Seaplane Squadron, was relieved of all duty with that squadron on June 6 and assigned to service with the Commission for Air Terms now sitting at Paris.

One Hundred Nicuports to Be Shipped to United States

Washington, D. C .- According to an official statement, it is estimated that 100 Nieuport-28 aeroplanes will be available for shipment to the United States as the result of settlements with the French.

New Naval Dirigible C-8 Flies 450 Miles in 8 Hours

Cape May, N. J., June 3.-The U. S. Navy Dirigible C-8 arrived here after a 450-mile flight from Akron, Ohio, which was accomplished in a flying time of eight hours. She passed over Washington at 12:50 p.m., having left Akron at 6 a.m., and arrived at Cape May at 6:15 p.m. Over the mountain region she made 47 miles an hour.

The C-8 has just been completed. It is the largest non-rigid dirigible yet built by the navy. It was in command of Lieuten-ant Commander Paunack. With him were Lieutenant Laurence and Lieutenant Larned, U. S. N. R. F., and Gunner An-thony and Machinist Mates Keller and Crampton,

Major Cushman Hartwell Returns to Washington to Become Executive Officer of Information Group

After six months spent in Siberia, Major Cushman Hartwell has returned to Washington and taken up the duties of executive officer in the office of the Information Group. Before going overseas Major Hartwell was executive officer of the Training Section.

Capt. Craven Recommends Retention of All Naval Air Stations to House Naval Committee

Washington, D. C.-Retention of all naval air stations now in operation was recommended to the House naval commit-tee on June 5 by Capt. Craven, director of naval aviation. He declared the stations were necessary to maintain the present efficiency of the service.

Capt, Craven also recommended an appropriation of \$6,500,000 for three dirigibles, one of which would be pur-chased from Great Britain at a cost of \$2,500,000. Other appropriations requested included \$3,933,000 for the marine corps air service, stations for which would be maintained at Quantico, Va., and Paris Island, S. C.

New Reserve Military Aviators

The following named officers, having completed the required tests, are rated as Reserve Military Aviators: Second Lieutenants John Blaney, Floyd P. Rob-erts, Charles S. Wages, First Lieutenant Harry A. Dinger, Captain Elmer E. Adler, A. S

House Committee

Washington, D. C .- In speaking before the House Committee on Military Affairs on June 4th Colonel Fuller submitted estimates of \$29,722,500 for the construction of aeroplanes and equipment. Of this amount he said there was an item of 50 planes at a total of \$17.625,000, one of Hispano-Sniza motors at \$7,325,000, and one for the purchase of pursuit planes for Hawaii, the Philippines and the Canal Zone at \$4,312,500. The purchase and construction program also called for an appropriation of \$3,074,000 for airships, including one semi-rigid, nine non-rigid and one rigid dirigible. The rigid ship, he said, would be purchased from the British government, it being au exact duplication of the latest British dirigible, 692 feet in length and with a consult. 692 feet in length and with a capacity of 2,000,000 cubic feet. This data was fur-nished by General Mitchell, who strongly advocated the inclusion of this item the budget, explaining that the British had found themselves seriously handicapped during the war through a need for this type of ship. An item of interest to the committee was one for \$100,000 for the training of Reserve officers in summer camps, this being the first appropriation asked for the purpose of paying and transporting Reserve officers.

Navy Has 1,000 Flying Boats and 700 Training Planes

Washington, D. C .- According to statements made by Captain Craven of the Ilouse Military Affairs Committee, the flying equipment of the Navy Department consists of 1,051 large flying boats and 763 school 'planes.

War Department Renews Lease on Wilbur Wright Field

Washington, D. C .- The War Department has renewed the lease on Wilbur Wright Field for use as a permanent storage and training depot. The tract comprises 1.100 acres.

No Civilian Training Camps This Year Washington, D. C .- An official state-ment issued by the War Department aunounces that owing to lack of funds and uncertain conditions training camps for civilians are not contemplated this year.

Air Service Officers Discharged

Washington, D. C .- The following of-Washington, D. C.—The following of-ficers of the Air Service have recently received their discharge: Captain Her-bert E. Ives, Second Lieut, Herman G. Oliver, Maj. Edward P. Curtiss, Second Oliver, Maj. Edward P. Curtiss, second Lieut, Gilbert D. Deere, First Lient, Wil-liam H. Harris, Jr., Capt. Robert C. Disque, First Lient, Edward Schoeppe, Second Lieut. DeWitt F. Ottman, First Lient, Robert Steinberger, Second Lieut. Charles H. Dauphin.

Reserva Officers to Receive Credit for Active Service

Washington, D. C.—The War Depart-ment authorizes publication of the following information;

The Secretary of War is submitting the chairmen of the Committees on Military Affairs, of the Senate and House of Representatives a draft of a proposed joint resolution to make it possible that members of Reserve Officers Training Corps shall receive credit for active service in the army or for special training received during the period of the emergency. It is proposed that the amount of such credits be determined by regulation to be prescribed by the Secretary of War.

Demobilization of Air Service

According to reports received from the Air Service, the net decrease in the total commissioned and enlisted strength from the date of the armistice to May 22 was 78 per cent.

The following table shows the present distribution of personnel, as compared with the figures for November 11, and per cent of net decrease. The May 22 figures do not include 332 officers and 3,047 enlisted men on detached service or at camps awaiting discharge

ladets Enlisted men Officers	170.436	May 22 259 37,329 5,076	net decrease 96 78 76	
Total	197,771	42,664	78	

During the week ended May 22, 1919, the decrease in the Air Service personnel overseas was 1,186, as against a weekly average of 3,570 for the three preceding weeks.

The strength of the Air Service in the U.S. and overseas on November 11 and May 22 was:

Reserve Military Aviators Appointed

Washington, D. C .- The following named officers, having completed the re-

names oneers, having completed the re-quired tests, are rated as Reserve Military Aviators: Capt. Horace Green, First Lieut. Armin F. Herold, Second Lieut. Bruce Cleveland, Second Lieut. Harold S. Purdy, Second Lieut. Ernest Goodrich, Second Lieut. Wayne V. Pittman.

Recent Naval Orders

Recent Naval Orders
Livat. Com, Robert A, Lavorder, to post graduate interestical in radio engineering.
Livat Com, Robert A, Lavorder Com, Lavorder Feld, V., Santon A, Compton Com, Lavorder Feld, V., Santon Com, Lavorder Com, La



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. M. Mahon





PACIFIC NORTHWEST MODEL AERO 921 Ravenne Boulevard, Seattle, Wash. BAY RIDGE MODEL CLUB idge Boulevard, Bay Ridge, Brook!
ANA UNIVERSITY AERO SCIENCE
CLUB

CLUB
Bloomlegton, Indiana
Bloomlegton, Indiana
BROADWAY MODEL AERO CLUB
BIS North Breadway, Baltimere, Md
TRIANGLE MODEL AERO CLUB
Baltimere, Md.
NEBRASKA MODEL AERO CLUB
'C-calo Nabagaka'

DENVER MODEL AERO CLUB 2820 Raleigh St., Denver, Colo. BUFFALO AERO SCIENCE CLUB o Christian Weyand, 48 Dodge St., Buffalo, N. Y.

Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicage, Ifl.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bidg.
Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB

455 Murray Ave., Milwaukee, Wis.

CONCORD MODEL AERO CLUB

MODEL AERO CLUB OF OXFORD

CAPITOL MODEL AERO CLUB

Weshington, D. C.

AERO SCIENCE CLUB OF AMERICA
Beech Big. E. 22rd 32.

AERO CLUB OF LANE TECHNICAL

MICH SCHOLL SCHOLL SCHOLL SCHOLL

AERO CLUB OF LANE TECHNICAL

Sedgwick & Division Streets, Chicago, Ill.

OR the benefit of the less experienced model builders and for those who have written to me asking for dimensions of the Lauder Racing Model (which was a former record holder for distance, hand-launched) I am reprinting an article taken from an early issue of Arzau. Acz. Although this model was designed nearly four years ago, it is still in line with the models of to-day and with little practice and careful construction the model flyer can get wonderful results from it.

In order that those interested may obtain an idea of the constructional details that tend to make the model the wonconstructional details that tend to make the model like wold-derful flyer it is, we will attempt to give a very complete description of the model. Some time before the National Competitions were held the model made a flight of 195 sec-onds, this constituting a world's record for duration for this type of model. In the contests the model flew 3.537 feet, which is also a world's record for distance. It will therefore be noted that this model is both a distance and duration flyer, both qualities being seldom found in one model.

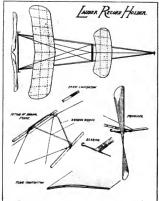
Reference to the accompanying drawings will give a clear idea of the constructional details.

loca of the constructional details. The frame or fuselage consists of two side members 40 inches in length, of straight grained spruce. At the center each member is of approximately circular cross section, and is ½ of an inch in diameter. The members taper to about 3/10 of an inch at the ends, the circular cross section being maintained throughout. The frame is braced by a strip of bamboo of streamline form, extending from one side members of the contraction of the before to the other, 18 inches from the apex of the frame. The ends of this brace are bent to run parallel to the side mem-ber of the frame, where they are secured by binding with silk thread and gluing. Piano wire hooks are also secured to the side members of the frame adjacent to the ends of the cross brace, and from these hooks extend wires of steel cross brace, and from these hooks extend wires of steel (No. 2 music wire), which run diagonally to the rear brace or propeller bar where they are secured. The frame is braced further by an upwarfly arched strip of bamboo, as shown in the dawings, this strip being 2½ inches in height. At the top of this brace are two bronze strips of No. 32 gauge, one above the other, one on top of the brace and the other bow. Adjacent to the ends of these strips of metal are perforations, through which pass bracing wires, one of which wires run to the pack of the frame, where a one of which wires run to the apex of the frame, where a hook is mounted for its reception, and the other two wires ex-propeller brace. The propeller brace consists of a strip of streamlined sprince, 11% inches in length. The propellers be-ing at an angle, clearance is allowed of ½ of an inch wide at of the propeller brace extend out 1 inch from the side mem-bers of the frame to allow room for the rubber motors. In order to avoid solting the ends of the side members of the order to avoid slotting the ends of the side members of the frame so that the propeller brace can be secured therein, this strips of bamboo are secured above and helow the end of each side member—by brinding with sill, thread and plain; the brace which is securely bound and gladed therein. The pro-peller bearings consist of strips of very thin broace (No. 32 gauge), about 3/16 of an inch in width, bent over 4/s-inch strips of German silver tubing, the tubing being soldered to the bronze strips and the propeller brace, which fits between the upper and lower portions of the bronze strips is securely bound and glued thereto.

The propellers are cut from solid blocks of pine, and are

12 inches in diameter. The blade, at its widest portion, measures 134 inches. The blades are cut very thin, and in order to save weight, they are not shellaced or painted.

ures 134 inches. The blades are cut very thin, and in order to save weight, they are not shellaced or painted. 20 size! to fin the tubing used in the bearing, pass through the propellers and are bent over on the outer side to prevent turning. A few small bronze washers are interposed between the propellers and the outer ends of the tubing to minimize friction when the propellers are revolving. Twelve strands of rubber are the propellers are revolving. Twelve strands of rubber are the propellers are revolving. Twelve strands of rubber are the propellers are revolving. Twelve strands of rubber are better the propellers are revolving. Twelve strands of rubber are better the propellers are revolving. Twelve the propellers are the coat of a preparation used for this purpose.





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

They Took a Chance with Death

They took a death defying chance Did Hawker and his mate And with true sportsmen's spirits they Gave no thought to the fate That might o'er take them 'ere they reached The goal they had in view But trusted to the elements And God to see them through

They've set a record even if The stake for which they played Is lost for their brave death and the Great task that they essayed Has won the admiration of The whole world and their fame Will live fore'er, for they were not Afraid to "play the game,"

'Tis by such supermen as these That daring deeds are done They blaze a new trail here and there And new records are won And in the sporting world to-day Many will emulate The daring spirits of such men As Hawker and his mate.

-Rose Villar.



Owing to certain necessary preparations for the trans-Atlantic flight, Dad is going to have some water bill to pay next time —By Fontaine Fex, in the N. Y. "Globel."

Everybody Can See It

"I don't like flying a bit," said pretty little Mrs. Newlyrich.
"I know this aeroplane cost more than a limousine, but we've got to fly so high nobody can see it."

When is a Landing "T" Not a "T"

A humorous incident was brought to light by one of Souther Field Georgia's flyers in relating a trip taken in one of Uncle Sam's airships to a small town in support of the Victory Loan.

The most essential attribute to Aviation is a desirable land ing field and an additional asset to a flyer is to know which way the wind is blowing, near the ground, for it is necessary in landing and taking off a ship to do so into the face of the wind.

of the wind.

On an active field strips of white canvas 12 feet long and 1 foot wide are laid out on the ground in the form of the capital letter "T" the top of the "T" facing the wind. The flyer upon seeing this from the air will be assured the direct tion of the wind.

tion of the wind.

Before starting on his trip the flyer has informed the Chairman of the Victory Loan Committee over the phone the necessity of a good landing field and also if possible he would appreciate their having a landing "T" on the Field. It was assured this would all be attended to. Upon arriving at the town, there, just on the outskirts, was a well-laid-out as me town, there, just on the outskirts, was a well-laid-out landing field; upon getting closer the pilot observed what appeared to be an immense cross standing upright in the center of the field. Someone had taken advantage of a large tree in the center of the field, which is the control of the field, had stripped it of its branches and then nailed a large bard across the top of the tree; the whole thing painted white and this was a landing "T."

ing "T."

The pilot wrote a little note and dropped into the field saying, "I am very sorry but your field is too small to land

in.

This enthusiasm and desire of all the southern towns to meet with every requirement of aviation is bound to have its effect, and we can readily predict that such towns as this, even though they make an innocent error the first time, will be eventually rewarded by being one of the regular stops on an aerial mail or passenger route.

-Wilson.

Double Crossed

Ever study symbols?" asked the philosopher at the 'dome. "Funny thing the Huns put a cross on their planes, and that's what most of 'em got. The Allies put rings on theirs, and our flying men made rings round the Huns.

Wear Bathing Togs

Reporter: "You seem nneasy about the Atlantic trip, sir. May I ask the cause?"

Aviator: "It's this difference between the Newfoundland and the London time."

"How does that worry you?"
"I can't work out whether I ought to start in my evening togs or not."

Auroara

Alarmed passengers: "Mus was that terrible noise, Cap-tain. Has one of the balloons burs?". But did that gallant old skipper lose his head? "Ladies and gentlemen," he said, "will you please return to your cabins. Everything is all-screne on this airship. What you heard was the day breat ing .- Aircraft.



The AIRCRAFT ADVERTISING AGENCY, INC. aims to cover the advertising field for aeronautics, including:

DISPLAY ADVERTISING for General Advertisers on Dirigible, Kite, and Spherical Balloons, Aeroplanes, Streamers from Aircraft, and by the dropping of Souvenirs and Handbills from the Air:

PREPARATION OF COPY and SKETCHES and the PLACING of ADVERTISING for manufacturers of Aircraft, Accessories, and Aviators' equipment, in aircraft and other periodicals.

AERIAL PHOTOGRAPHS of Cities, Summer Resorts, Country Places, Real Estate Developments, Etc.

(This Agency will be glad to hear from aviators and companies who have aeroplanes, or balloonists who have balloons, available for advertising purposes in any part of the country, and who are in a position to undertake and carry out business of this kind.)

THE AIRCRAFT ADVERTISING AGENCY, Inc.

GRANVILLE A. POLLOCK, Pres. (Late Captain U. S. Air Service; Member Lafayette Escadrille; Aeronautic Engineer.) S. HERBERT MAPES, Vice-Pr. (Late Captain U. S. Air Service; formerly Pres. Mapes Construction, Co.) REED G. LANDIS, Vice-Pr. (Late Major M. A., U. S. Air Service, Second Ranking American "Ace.") WILLIAM MENKEL, Sec'y. (Late Captain U. S. Air Service; formerly with Review of "Come along and Fly, you don't need to be atraid, for we will tosure you."



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Night Landing Apparatus to Indicate Distanch of Aeroplane from Ground

THREE searchlights, which are run by a fan generator attached to the aeroplane, make up the apparatus to indining that and the distance of an aeroplane from the ground in night landing. Two searchlights, located under the extreme ends of the lower planes, project their rays perpendicularly to the line of light, and in such a manner that they cross at a certain distance. A third searchlight located at the end of the fuselage projects its ray so that it crosses the others. Each light is mounted on a joint in such a fashion that it may be moved from side to side.

The regulating consists in giving to the searchlight such an angle that the three rays meet exactly on O, a point located slightly in front on the line of flight, so that when descending as the horizontal appearance is lost, the rays meet geometrically in front of the pilot, permitting him to see accurately the beacons which he should always keep in sight.

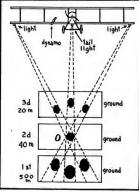


Diagram at the use of night landing lights

Its use is as follows: If, for example, the pilot is at an altitude of 500 meters, he prepares to land, he notes on his altimeter the precise altitude. He knows that from there it will take T seconds to get to the ground; and he has only to go through these few operations:

- 1.-He switches on the dynamo and commences to de-
- 2.—He takes care that the ray of the rear searchlight (which at this altitude is ahead) reaches progressively point O, which has been calculated in such a manner that it is reached at 40 meters, for example.

Then the pilot knows that it takes T seconds to land, a time so short that he should straighten out his machine immediately.

The advantages are: 1—The machine does not require special construction to accommodate this apparatus. 2—It is neither bulky nor expensive. 3—It brings the pilot over point O from which he may land in a given number of seconds. 4—It is no bother (only the dynamo need be locked, the movement of the joints and connections truet up). 5—The ceptionally hard to land them at nicht.—Taken from "Eureka"—translated from "Tohkit."

THE THOMAS-MORSE S-4 C SCOUT

OR advanced training at nearly all of the Government fields the S-4 C Scout has become popularly familiar.
For this stage of training the S-4 C has been used almost exclusively because of its ease of control and manoeuverability made possible by its small size, light weight per horse power and generously proportioned control surfaces.

te usual armament consists of a fixed Marlin or Browning machine gun, firing through the sweep of the propeller; an Adis telescopic sight mounted at the level of the pilot's eyes. The stick type control is used; ailcrons are operated by steel

The stack type control is used; anterons are operated by steet tubes run concealed in the upper plane, aff of the rear wing leam, similar to the French Nieuport Scout.

The S-4 C is suitable for use as a sport machine and for exhibition purposes. A from view of the S-4 C appeared in the March 24 issue of AFML, AG.

		General	d Dimensions	
Span				.26' 6"
Length				.19' 10'
Height				. 8' 1'
		W	Weights	
Total w	eight, loade	d		330 lbs
Area, li	fting surface	ce (includi	fing ailerons)	sq. ft
Loading	per sq. fr	L lifting s	surface	5.7 lbs
Require	d horse po	wer		90
Weight	of machin	e loaded p	per horse power	14.8

Engine			.Le	Rhone	(air	cooled	rotary)	80 H.P.
Engine R.I	P.M							1,250
Fuel capac	itv							30 gal
Fuel durati	on at ful	1 pc	wei				3	34 hours
Oil capacit	Y							6 gal.
Oil duratio	n at full	por	ver.				4	1/2 hours
Propeller, 1	vpc							2 bladed
Propeller,	diameter							8' 0"
Propeller,	R.P.M.							1,250
			Lan	ding Chi	e a min			
Туре								"Vec"
							2	

Landing Chassis
Type
Wheels
Tires
Aeras of Control Surfaces (Square Feet)
Ailerons
Elevators
Rudder
Horizontal stabilizer
Vertical stabilizer
Performances
High speed
Low speed
Cilmb in first 10 minutes 7 500 fee

The Curtiss Model 18-B Biplane

(Continued from page 676)

ring surrounding the cockpit, and one which fires through an opening in the under side of the fuselage,

Landing Gear

The track of the landing gear is 59½". Wheels, 20° in diameter. The axle is located 44½" from the nose of the funeslage, and 99½" below the center line of engine. What chine occurs at a point 10.6" behind the axle of landing gear. When at rest on the ground, a straight line from the landing wheels to the tall skid makes an angle of 11° 15 minutes with the center line of thrust.

Tail Group

The triangular fin is 3' in length and 3' 6" in overall height. Rudder, 40' in overall height and 31 11/16' in width. The stabilizer is divided at either side of lueslage. Maximum depth at the body, 2' 5'. Maximum span overall, 10' 10½". Elevators are 18½" in width.

Engine Group

The engine is a Cirrtiss Model K-12. A complete description of ir appeared in the February 3, 1919 issue of ARRIAL AGR. This engine is a 12-cylinder Vee Type with cylinders cast en bloc. Aluminum is used extensively in its contact on bloc. Aluminum is used extensively in its construction.

struction.

Rated horsepower at 2500 R.P.M. of the crankshaft, 400. Bore and stroke, 45% by 6. Ignition is supplied by two high tension double spark six cylinder magnetos, located at the front end of engine and driven by beveled gears from vertical shaft through thexible couplings.

Two Duplex type carburetors are used. They are located between groups of cylinders. Carburetors are supplied with an auxiliary altitude hand-controlled air valve and also with non-back-firing screen.

non-back-firing screen. Without oil or water, the Model K-12 weighs 680 pounds. Dead weight per rated horsepower, 170 pounds, per BHP, per hour; oil. All pounds per BHP, per hour. The propeller is 9° 0° in diameter, In flying position, the tips of the propeller clear the ground by 88½. When the machine is at rest there is a clearance of 17½, between the propeller in and the ground.



0" ĭ"

90

The Curties Model 18-B biplane with a 400 h.p. Curties Model K engine



(Continued from page 683)

(Contraved from page 881)

from which departure was taken and course set for 32, Julius, N. 37. Continued on the contravation of the page 32, 1987, and the page

C-5 Breaks From Moorings

C-5 Breshs From Moorings

"Severy possible effort was made to hidd the
C-5 berry possible effort was made to hidd the
C-5 berry possible effort was made to hidd the
C-5 berry possible efforts the control of the contr

and drafts for comment far better. "All told the discomforts were very slight and of no moment as rompared with the general in-terrst and exprrience of the flight."

Special Orders 123-124 (Continued from page 695)

The appointments of the following named of-ficers for the period of the existing emergency are announced: To be colonels-Lieut, Col. Oscar Westover,

ieut. Col. James A. Mara, Lieut. Col. William Prarson. To be lieutenant colonel—Maj. Horace M. Hickam.
To be first lieutenant—Second Lieut, John J. Redfield.

The following named officers are relieved from further duty with the Spruce Production Division, Vancouver, Wash:
Second Lirutenants Charles M. Commins, John A. Dolan, Affred Gagnon, Isaac Lashua, Frank J. Hellman, William H. Taylor.

The following named officers will proceed to Camp Pike, Ark.: Capt Thomas J. Zimmerman, Second Lieut, Will G. White.

Second Lieut. Forrest D. Bradshaw will pro-ceed to Godman Field, Camp Knox, Stithton, Ky. The following-named officers are detailed for duty with the direction of the Director of Pur-chase, Storage and Tialic, Holoken, X. J.: 1 apt. Clarence E. Osborne, First Lieuts. Daniel Crawford and John McGuire, Second Lieuta, Lloyd J. Peterson, Theodore B. Stuteman, Max W. Henney, John B. Shaver, Carl F. Kennedy,

Second Lieut. Rufus J. Pilcher will proceed to March Firld, Riverside, Cal. Second Lieut, William J. Davidson is detailed for duty with the Medical Department, and will proceed to Camp Lewis, American Lake, Wash, for duty in the base hospital,

Second Lieut, Leo A. Benoit will proceed to United States Naval Air Station, San Diego, Cal.

Par. 88, S. O. No. 11940, May 21, 1919, relating to Second Littl. Leland M. Baum, ia re-worked.

Par. 54, S. O. No. 103-O. W. D., May 2, 1919, relating to Capt. James A. Christie, is revoked. The leave of absence granted First Lieut. Matthew II. (PBrien by Par. 130, S. O. Ne. 120 O, W. D., May 22, 1919, is extended five days.

Uspt. William Winter will proceed to Hazel-burst Field, Long Island, N. Y.



Vol. 9, No. 15

JUNE 23, 1919

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PREPARATION OF COPY and SKETCHES and the PLACING of ADVERTISING for manufacturers of Aircraft, Accessories, and Aviators' equipment, in aircraft and other periodicals.

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(This Agency will be glad to hear from aviators and companies who have aeroplanes, or balloomists who have balloons, available for advertising purposes in any part of the country, and who are in a position to undertake and carry out business of this kind.)

THE AIRCRAFT ADVERTISING AGENCY, Inc.

GRANVILLE A. POLLOCK, Pre (Late Captain U. S. Air Service; Member Lafayette Escadrille; Aeronautic Engineer.) S. HERBERT MAPES, Vice-Pr, (Late Captain U. S. Air Service; formerly Pres. Mapes Construction Co.) REED G. LANDIS, Vice-Pr.
(Late Major M. A., U. S.
Air Service, Second Ranking
American "Ace.")

WILLIAM MENKEL, See'y.
(Late Captain U. S. Air Service; formerly with Review of Reviews.)

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No. 15 JUNE 23, 1919 TABLE OF CONTENTS PAGE The Atlantic Bridged in Magnificent Non-Stop Flight 719 Greater Naval Aviation Appropriation Urged...... 720 The News of the Week..... 721 Vickers-Vimy Biplane Makes First Non-Stop Trans-Atlantic Flight, 723 General Properties and Uses of Plywood 724 Functions and Organization of National Advisory Committee on Aeronautics 727 The Grahame-White Sporting Aeroplane 728 The Napier "Lion" 450 H.P. Aero Use of Ultra-Violet Light for Testing Balloon Fabrics..... 734 Effect of Wrapping on the Strength of Aeroplane Struts........ 735 The Aircraft Trade Review 736 U. S. Aerial Mail..... 737 Naval and Military Aeronautics. . 738 Foreign News 740 Elementary Aeronautics and Model Industrial Department..... 744

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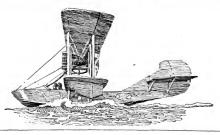
Euriss

"I always loved it!"

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VOL. IX

NEW YORK, JUNE 23, 1919

NO. 15

THE ATLANTIC BRIDGED IN MAGNIFICENT NON-STOP FLIGHT

N one straight flight the Atlantic has been crossed. The feat is the greatest sporting event the world has ever known, and from it the names Alcock and Brown will go down in history.

down in history,

In commenting on the flight Henry Woodhouse, vicepresident of the Aerial League of America, declared that
was "the most stimpendous feat of the age," and would
advance the science of aviation to a degree not to be computed. One of the results that would be sure to follow
within two years, he said, was that regular a real expresand passenger planers would be flying between the continents. and passenger planes would be flying between the continents. "It is the most stupendous achievement of the age," and Mr. Woodhouse. "Few persons, even those in the aeronaguized movement, as we call it, believed that a frail thing of sticks and wood, earness and wire could be capable of such had seen at close hand the remarkable progress of aerial science during the war, believed that the aecomplishment of a non-stop flight across the ocean was at least five years of, and this opinion, which was held almost unanimous, adds of the control of the progress of aerial science flight across the lines of the progress of a read that the names of Alcock and Brown, with that of Read and his gallant crew, will go down in bistory with that of Columbus as leaders of a new zince of supermen and the leaders in a "It is a stupendous thing to think of men lancking them:" It is a stupendous thing to think of men lancking them."

new cfa of communication between the continents, and the "It is a stupendous thing to think of men lameliting them: "It is a stupendous thing to the think of the tail, depends upon the success in flight more upon the confi-dence and belief of its pilots than upon any other factor. The aeroplane remains aloit and continues its terrific speed only so long as the nerve and endurance of the pilots remain

only so long as the nerve and endurance of the pilots remain unswerring.

"This flight advances the science of aviation at least fice years and. I believe, opens the way to permanent aerial mail, and the pilot of the pilot of

safer aircraft.

Second, there are huge plans to he announced for the employment of aircraft for transportation and other utilitarian ployment of aircraft for transportation and other utilitarian purposes, which are expected to go into effect this summer, and the performances which will result will astonish the world. Some of these plans have been under consideration in the United States, others in England, France and Italy, and aim to establish aerial lines throughout the world. The suc-cessful flight of Captain Alcock and Lieut. Brown will hasten their realization.

Third, Captain Alcock, Lieut, Brown and Commander Read and the gallant crews of the NC's have opened the trans-Atlantic airways, doing in fitteen hours more than the world's engineers did in years in opening a way from the Atlantic to the Pacific through the Isthmus or by the build-

worth a engineers of in years in optimize a way from the ing of the world series that a consistency of the control of the second of the ing of the world series that the second of the second of the ing of the world of the second of the ing of the world of the second of

largest aeroplane at present under construction.

Sixth, Ireland is destined to become one of the world's

greatest airports, where trans-Atlantic air lines will laid to refuel before continuing their journey. Seventh, too much cannot be said of the reliability of the motors used in this flight, which, combined with the skill and daring of the aviators and the reliable instruments for navigation, opened an entirely new epoch in aeronautics and permit planning the use of aeroplanes for transportation over long distances, where the tremendous speed of aeroplanes can solve difficult problems of transportation.

Comments on the Flight

Alan R. Hawley, president of the Aero (Inb of America, called its "man, president of the Aero (Inb of America, called its "man, or an expectation of the Aero (Inb of America, called its "man, or an expectation of the world almost under any circumstant by to any part of the world almost under any circumstant of the Augustus Ports of the World America, and the Aero (Inb, and Inb, and Inb,

We are congitted at the success of Captain Alcock's flight. We have already seen what the seaphane can do, and this flight of Alcock's shows how tremendous are the possibilities when we can use land planes to cross the ocean. I have no doubt that when the American army land plane starts its flight from the Atlantic to the Pacific it will go through with-

flight from the Atlantic to the Facinic it will go inrougn wanout a hitch.

"It was a worderful feat," said Secretary Daniels. "I con"It was a worderful feat," said Secretary Daniels. "I con"It was a worder of police with him. His flight is
dictive of the preat thines that are about in finite of the conficiency of the preat thines that are about in finite of the conRear-Admiral David W. Taylor, chief mayal constructor,
who is conceded to have been the "father" of the American
plan to cross the sea in an airship, also expressed his admiration of the phoke of the two British saider. "It means
that long-citistance dying will be oferended they more popution of the property of the conditions of the continuation of the content of the conditions."

lar and we can expect other record-making trips.

lar and we can expect other record-making trips."
"I am pleased to hear of the successful repotation of the second stage of the progress in trans-Atlantic flight," said Gleim H. Curtis, pioneer avistor and builder of the NC-4, the first heavier-than-air craft to cross the Atlantic. "The crossing with our seaplane with one stop in miloccan was the company of the control of the company of the co the culmination of that event commercial aviation as applied

the culmination of that event commercial aviation as applied overseas flight shall have been accomplished. "Naturally, I prefer the scaplane for the trans-Atlantic flight to the plane designed primarily for land flights. In the first place, there is always the difficulty of taking off from the land, as has been every clearly demonstrated by all of the flights which have been attempted in Newfoundland. Ac-cording to reports from St. John's the Vickers had a hard time leaving the ground with the heavy load it carried. The

time leaving the ground with the heavy load it carried. The Martinsyde crashed when it strick a small bump in the earth. "The flight of our three NC planes showed, much to the surprise of many persons, that machines of that type are able to stand a great deal of punishment from rough seas. With rovements suggested to us by experience they will be capable of riding out reasonably rough weather

Third Stage Within a Year

"Aviation is developing faster than could with reason be hoped. Within another year we shall have accomplished the trans-Atlantic flight with a useful load, thus reaching the third stage of overseas aeroplane development.

"I shall cable my congratulations to Captain Alcock and Lieut, Brown.

"One great stunt," was the comment of Lieut. Commander Albert C. Read of the American seaplane NC-4, the first to cross the Atlantic, on the successful flight of Captain Alcock and Lieut, Brown.

"While there is nothing which will add much information to the art of aviation as a result of the flight," he continued, "it was a wonderfully nerry thing to attempt and a magnificent achievement. I have much admiration and respect for the most who attempted the great leat in face of such olds, the most who attempted the great leat in face of such olds, and the such as the su made the attempt at the right time.

Commander John H. Towers of the NC-3 said:

"It was a splendid feat."

GREATER NAVAL AVIATION APPROPRIATION URGED

RGING that Congress appropriate \$45,000,000 for naval URGING that Congress appropriate \$45,000,000 for naval avaition during the next fixed a year and declaring that \$6,000,000 is the very lowest figure that should be appropriated, if the American Nava is not to fall behind, Sere-lary Daniels sent to Senator Carroll S. Page, Chairman of the Naval Committee, a letter urging an increase in the \$45,000,000 appropriation granule by the Benefit of Page that if the appropriation that the senator of the senator

Secretary Damets intormed sentancy rage that it me appropriation should remain at \$15,000,000 this country could only mark time' in aviation, when it should be leading. Great Britain and France are going afted with plans for aviation development on a large scale. Great Britain has made available for the current year an appropriation of \$230,000,000 for army and navy aircraft development, and France \$20,000,000. The American Government is behind in lighter. than-air development. It has no rigid dirigibles. The British Government is going in strongly for the development of large rigids. The rigid dirigible R-34, which is soon to leave England for a round trip trans-Atlantic flight, is part of the British development.

Secretary Daniels' letter follows:

"My DEAR SENATOR:
"The Naval Bill as reported to the House has cut the appropriation for Navy Aviation to \$15,000,000. It deem it my duty to bring to your attention the fact that with this amount Navy Aviation will practically 'mark time' during the next year, which should be a year of rapid development of this arm of the Navy in countries other than the United States. This is sufficiently indicated the property of the next year of the Navy in countries other than the United States. This is sufficiently indicated that the property of the next year of the Navy in countries other than the United States. This is sufficiently indicated the next year of the Navy in countries other than the United States. This is sufficiently indicated the next year of the Navy in the N cated by the fact that in Great Britain the appropriation for aviation made for the current year amounts in round figures to \$320,000,000. This includes all aviation for military purposes,

\$20,000,000. This includes all aviation for military purposes, and should, of course, be compared with the total contemplated appropriations for both Army 200,000. The third propriations for both Army 200,000. The Charlest Board of the Navy, after extended hearings covering the whole field of aviation, recommended a program for the next fixed year which our experts estimated would be considered to the contemplation of the propriation of the provided if we are to make any approach to the aviation of the propriation of the General Board.

"It will be recalled that in 1909 the feat of Bleriot in flying across the English Channel in a plane propelled by a motor of about 25 H.P. was regarded as miraculous. In ten years the development of heavier-than-air craft has been so remarkable and progressive that recently we have seen our multiple-engined NC-4 successfully completing a voyage from New York to Plymouth by way of Newfoundland, the Azores and Portugal. We are now expecting a visit from the British Rigid R-34, which is to make the attempt to fly directly from Rigid R-34, which is to make the attempt to ny directly from England to the United States. The performances of this British Rigid to date indicate the practicability of a voyage, and even should the present attempt fail by some misclance, there is every prospect that the voyage will soon be success-fully accomplished.

"These long voyages have demonstrated beyond doubt the receiving voyages have eministrated ocyonic domin time practicability of the large lighter-than-air ship. There can be no doubt in the mind of any one that aviation is destined to assume a role of tremendous importance in the affairs of the world. At present the largest field for aircraft is the military one, and by the rapid development of such aircraft only is it

practicable to reach a condition of commercial application. "I feel sure you will agree with me that the United States, where was built and operated the first successful flying machine, which under the stress of war has made supreme effort during the past two years and is now, broadly speaking, abreast the rest of the world in aeronautical development, and ahead in some respects as instanced by the successful voyage of the NC-4 should not now falter and fall by the wayside in avia-

"I regret to inform you that an appropriation of \$15,000,000 Tregret to introrm you that an appropriation of expansions will not suffice to permit the construction of large rigids in this country, and possibly it will not even allow the beginning of a 'rigid' program. There is not on this continent at this time a dirigible hangar large enough to house the English R.34, and the visit of that vessel to our shores must be cur-

K-34, and the visit of that vessel to our shores must be cur-tailed because of the possibility of the ship being wrecked in the event of occurrence of bad weather. "The rigid drigible has been of splendid service during the war. Both Germany and Great Britain used them success-itilly. Admiral Jellicos stated that a rigid dirigible was worth two light cruisers, and it is of interest to note the statement of the British Admiralty to the effect that at the Battle of of the British Admirally to the effect that at the Battle of Jultand the German fleet, though inferior in numbers, was Jultand the German fleet, though inferior in numbers, was of its sconting airships. It may be of interest to you to know that inquiries are now being made on the part of the British Government as to the possibility of a hangar for rigids being allowed in this country for use by a foreign-owned Zeppelin employed commercially.

"I will not dwell on the part played during the war by

aircraft in parrolling our own coast and the coasts of our further to the coast of our coast and the coasts of our importance of aircraft operations with the fleet. "Spotting from aircraft increases the gunnery efficiency at long ranges tremendously, and gunnery efficiency perhaps is, more than anything else, the real measure of efficiency of the

fleet. Several times in our recent fleet exercises low visibility or smoke screens absolutely prohibited spotting from ships, and all spots had to be taken from the spotters in the aircraft overhead. The improvement in the ability to spot is one of the compelling reasons for shooting at longer ranges. A naval action undoubtedly will be begun in clear weather at ranges of over 20,000 yards and spotting from high in the

air will be of paramount importance.
"In the British fleet planes are now carried on all battle-ships as well as in special vessels intended to convey them. Aviation is recognized as a definite and permanent part of the flect.

"As regards the large flying-boat type, we are in a reasona bly satisfactory position, but the type must be further devel-oped and will be during the year if money is available. As regards aeroplanes for regular use of the fleet, a recent development, and one which, as indicated, is essential for fleet efficiency, we should take the matter up vigorously at once, install the best type of such craft now available, and keep the install the nest type of such crart now available, and keep the installation up to date as the art develops. As regards lighter-than air craft, we are ready to build on a reasonable scale on practically equal terms with the rest of the world. The type is sufficiently developed to warrant building in reasonable numbers, and in the judgment of the military experts of the numbers, and in ...
Department, the prompt development craft is of the utmost importance.
"Sincerely yours "Josephus Dannels." Department, the prompt development of the lighter-than-air



THE NEWS OF THE WEEK



aeroplanes at Locust Valley and at Great Neck Bay, L. I., respectively, from off the Battery. Mr. Allen was piloted to his home by his son, Captain A. Livingston Allen, in less than thirty minutes. The time of travel was thus cut to less than half and the comfort and convenience of travel greatly increased. It is predicted that this means of travel will be utilized by several business men whose offices are in downtown New York within a few

Boston to New York in One Hour Lieutenant Colonel Leonard II. Dren-nan, Air Service officer of the North-eastern Department, made a record flight between Boston and New York in a De

between Boston and New York in a De Haviland Four, flying from Boston to Hazelhurst Field, L, I., a distance of 175 miles in 83 minutes, thus averaging over two miles a minute. Lieutenant Willis R, Taylor accompanied him as a passenger.

Utica Newspaper Delivered by Aeroplane Utica, N. Y.—The Utica Daily Prest is arranging with the Mohawk Valley Aeroplane Corporation for the delivery of its special aeroplane edition to Old Forge and the surrounding districts.

Aerial Commuters From Down-town Navy Plans Include Around-the-World New York Taken to Country

New Homes in Plying Boat to Country

New Homes in Plying Boat a commuter's aerial service, Mr. Edmund Rambudoh, broker, and Mr. R. W. Allen were taken to their homes by Curtiss hydroin naval aviation circles declared that the New Homes Navy's plans for developing lighter-than-air travel had not stopped short of the possibility of a round-the-world flight in a dirigible.

In discussing the Naval aeronautic pro-gram, Secretary Daniels intimated that a trans-Pacific flying boat trip has been contemplated.

Aerial Express Service Between Allen-town and New York in Operation Arrangements have been completed be-

tween Philip W. Blake, executive secretween Philip Wi. Blake, executive secre-tary of the Allentown (P.a.) Chamber of Commerce and Lieutenant Morse D. Levitt of the American and Canadian Allied Flying Circus, Inc., of 1482 Broad-way, N. Y., for the operation of a regular aerial express to make aeroplane de-liyeries of merchandise from the New York market for the merchants of Allentown. This will probably be the first aerial express service in operation on a co-operative basis.

The consignments of goods are shipped-from the Central Park, L. I., field of the flying circus and consist of assorted merchandise. The aeroplane lands at the Allentown Country Club, on the outskirts of the town. Lieutenant Franklin F. Snyder, who has spent two years in the air service, was the pilot on the first trip.

The latest entry for the trans-Atlantic flight is the "Sea Bird" of the Alliance Acroplane Co, a company controlled by Waring and Gillow. It has been built from the design of Mr. J. A. Peters, who will pilot the machine across the Atlantic and is a single-seater biplane with a 430 hp. "Lion" Napier engine. The machine is illustrated on this page, which shows the comfortable accommodation provided for both pilot and navigator. The mafor both pilot and navigator. The ma-chine is litted with wireless, having a transmitting range of 2.50 miles, and a receiving range of 2,500 miles, and a directional installation by means of which the navigator will be able to be in direct communication with the compass stations both in Newfoundland and Ireland at any time during its flight, and can accordingly set his course independently of other means. The main particulars of the "Sea Bird" are as follows: Span, 53 ft; length, 33 ft. 6 ins; area, 700 sq. ft; total weight, 7400 lbs; pertot, 500 gals; oil, 50 gals; range, 3000 miles; max. speed, 140 m.ph.; landing speed, 45 m.p.h.; engine, 450 h.p. Napier. time during its flight, and can accordingly

Aerial Landing Field Established at Oklahoma City

Oklahoma City.—A forty-acre landing field, known as Westwood Field, has been in operation for several months. It is located in a suburban section of the city, convenient to rail and street car transportation.



The English officers who arrived on the Adriatic to prepara for the arrival of the dirigible R-34. From left to right (front row): W. H. Thompson, J. H. Gulle, Leonard Sparks, Ivar England. (Back row): Martin Rompton, Ernest Turner, Lieut, Col. Lucas, in command, Major Follon and William Angus



Hangar erccted by Alfred Decker & Cohn, for two Curtiss JN-4D-2 aeroplanes, used in a regularly-scheduled delivery service

Chicago Clothing Distribution by Aero-plane Follows Regular Routes Chicago, Ill.—The aerial delivery ser-vice for Alfred Decker & Cohn, Chicago clothing merchants, was inaugurated on June 3. A 40-acre field at Maywood is the headquarters of the express system and two Curtiss JN-4D-2 aeroplanes piloted by Lieut. David L. Behncke form

the original equipment.

The first week's schedule included trips to the leading colleges and universities in the Middle West. Routes have been laid out between Chicago and Madison, Wis.; Chicago and Galesburg: Chicago

Champaign, Ill.; Chicago and South Bend, Ind., and Chicago and Lafayette, Ind.
The Chicago Madison route includes stops at Beloit College and the University of Wisconsin; the Chicago to Galesburg route takes in Knox College; the Chicago to Champaign route takes in the Unito Champaign route takes in the University of Illinois; the Chicago to Lafayette route takes in Purdue University, and the Chicago and South Bend route takes in Valparaiso University and the University of Notre Dame.

Leaving Chicago at 12 o'clock, the aero planes reach Kankakee, Ill., forty-five minutes later. They leave Kankakee at 2:30 and an hour later deliveries are made in Champaign.

Lincoln Aero Club, of Nebraska, Af-filiates With Aero Club America The Lincoln Aero Club of Nebraska,

with its headquarters at Lincoln, was accepted into affiliation by the Aero Club of America at a meeting held June 4.

It held its first banquet on April 2, at

which over two hundred people were present, and the prospects are for the working up of a very enthusiastic aero-nautic contingent in Lincoln.

naute contingent in Lincoln.
The appointed officers of the Lincoln Aero Club of Nebraska are as follows:
President, Raymond R. Farquhar; First Vice-President, Phil L. Hall, Jr.; Second Vice-President, Leo Fablinan; Secretary, Abe D. Zook; Treasurer, S. J. Dunn; Chief Engineer, H. B. Wild.
The insignia of the Lincoln Aero Club of Nebraska is most appropriate being

of Nebraska is most appropriate, being that of a winged head of Abraham Lin-

It has followed by-laws of the Aero Club of America as its constitution and has six classes of membership, i. e., honorary, collegiate, life, army and navy, resident and non-resident. Articles of incorporation of the Lincoln

Aero Club of Nebraska were filed in the office of the Secretary of State, State of Nebraska, on the first day of April, A. D.

American Medical Association Convention Discusses Medical Aspects

of Aviation

Atlantic City, N. J.—Physicians outlined plans to aid fliers at a meeting held on June 13. The first society in the United States to lay down what are said to be scientific and accurate tests to deter-mine the abilities of an airman organized and elected officers. The organization is the outgrowth of the American Medical Association convention.

This body will help the Government in taking and maintaining the air supremacy of the world, according to Colonel John O. McReynolds, Dallas Tex., who was elected president of the newly formed Air Service Medical Association.

It is planned to popularize flying, and it is expected thousands will become aviators, he said. Tests will be made to deter-

tors, he said. I ests will be made to deter-mine the special work for which each is fitted, the height to which he may safely ascend, and details of a similar nature. The first aeroplane ambulance seen in Atlantic City arrived here on June 13 from Mineola, L. I., after a flight of 118 miles in 80 minutes. It bore a medical man coming here to attend the convention of the American Medical Association, the

of the American Medical Association, the first to arrive by this rout army hospital work, and the trip was made to demon-strate the value of the army medical equipment under special permission of the properties of the properties of the government Lengths of the Starton of the Computer of the Computer of the Barnett traveled as a secretary of the Computer of the Barnett traveled as a secretary of the Computer o

Burnett traveled as a passenger.

A sick or wounded soldier can be carried in a compartment in the rear of the plane in absolute comfort with room for plane in absolute comfort with room for the surgeon to attend him. The patient lies on a Stokes litter, a single wire held in by specially arranged webbing belts. He is placed on the bed through an aperture in the lower part of the fuselage of the plane.

De Hart and Budwig Carrying Passengers from New York City Field New York, N. Y.—Dana C. De Hart and Gilbert C. Budwig have started a passenger-carrying service from their fly-ing field at Hillside Drive and North Westland, Queens, N. Y. Both the avi-ators were employed as civilian instruc-tors throughout the war, and since that time have been in the aerial mail service. Curtiss biplanes are used, which are in-spected before each flight. All passen-gers are insured to the extent of \$1,000.

Aerial Map of Fort Sill-Oklahoma City Route Being Made Oklahoma City.—An Army photograph-

ic squadron is making a huge photographic mosaic of the route between Fort Sill and mosaic of the route between Port Sill and Oklahoma City, covering a strip eighty miles long and twenty miles wide. Thirty thousand plates will be exposed and when completed the map will be 76 feet long and 16 feet wide.

The squadron has established its headquarters at Westwood Field, and is in charge of Lieut. L. M. La Plant, and con-sists of four pilots, three observers and six enlisted men.



or," equipped with aix Napier "Lion" engines of 500 horsepower each. Span of the middle plane is 13t feet 3 taches Oversit height is 37 feet 3 inches. Oversit length, 73 feet 2 inches. Total weight, 45,000 pounds The Tarrant "Tabe

VICKERS-VIMY BIPLANE MAKES FIRST NON-STOP TRANS-ATLANTIC FLIGHT

By successfully flying across the Atlantic from St. John's, Newfoundland, to Clifden, Ireland, Capt. John Alcock and Lieut. Arthur W. Brown, pilot and navigator of the Rolls-Royce motored Vickers-Virny biplane, are the wimers of the Daily Mail \$5000 prize. The flight of approximately 1,900 miles was completed in 16 hours and 12 minutes averaging. 16 hours and 12 minutes, averaging nearly 120 miles an hour.

The report of Alcock and Brown to the

The report of Alcock and Brown to the Aero Club was as follows:
"Landed at Clifden at 8.40 A.M., Greenwich mean time, 15th of June, Vickers-Vimy Atlantic machine leaving New-foundland coast at 4.28 P. M., Greenwich mean time 14th of June. Total time, 16 hours 12 minutes.

ALCOCK & BROWN. But the brief and modest description which comes from the airmen at Clifden tells of an adventurous and amazingly hazardous enterprise. Fog and mists hung over the North Atlantic and the Vickers-Vimy biplane climbed and dived, struggling to extricate herself from the folds of the aeroplane's worst enemies. On one occasion she rose to 11,000 feet and swooped down almost to the surface of the sea, and at times the two voyagers found themselves flying upside down.

Before coming to earth near the Clifden wireless station Alcock circled the wireless aerials, seeking the best spot to reach the earth, but no suitable ground was found, so he chanced it in a bog.

The wireless staff rushed to the aid of the aviators. They found Brown dazed and Alcock temporarily deafened by the

force of the impact.

Captain Alcock's first interview on the flight as published in the Daily Mail, is as follows:

"We have had a terrible journey. The wonder is that we are here at all. We scarcely saw the sun or the moon or the stars. For hours we saw none of them,

The fog was very dense and at times we had to descend to within 300 feet of



C Keystone View Co.

Captain Jemes Alcock, D. S. C. (at right) sed Lieutenent Arthur Whitten Brown, who made the first non-stop trans-Atlastic flight in a Vickers-Vimy biplane

the sea. For four hours the machine was covered in a sheet of ice, caused by frozen sleet. At another time the fog was so dense that my speed indicator did not work, and for a few seconds it was very

alarming.
"We looped the loop, I do believe, and did a very steep spiral. We did some very comic stunts, for I had no sense of the horizon.

"Winds were favorable all the way, northwest, and at times southwest. We said in Newfoundland we would do the trip in sixteen hours, but we never thought we should. An hour and a half before we saw land we had no certain idea where we were, but we believed we were at Galway or thereabouts.

"Our delight in seeing Eastal Island and Turbot Island, five miles west of Clifden, was great. People did not know who we were when we landed and thought we were scouts on the lookout for the Vimy. "We encountered no unforeseen condi-tions. We did not suffer from cold or We did not suffer from cold or exhaustion, except when looking over the Then the sleet chewed bits out of

side. Then the sleet chewed our faces. We drank coffee ate sandwiches and chocolate. We drank coffee and ale and "The flight has shown that the Atlantic flight is practicable. It should be done not with an aeroplane or a seaplane but

with a flying boat.

"We had plenty of reserve fuel, using only two-thirds of our supply. The only thing that upset me was to see the ma-chine at the end get damaged. From above, the bog looked like a lovely field, but the machine sank into it up to the axle and fell over on to her nose."

Mists robbed the night of the advantage of the full moon and the propeller of the generator for wireless apparatus was torn away by the wind soon after the start. So away by the wind soon after the start. So the two aviators were thrown upon their own resources. The skilful navigation which brought the machine near to the center of the Irish coastline was one of the finest features of the flight. Before starting on the flight Lieut. Brown had stated that an effort would be made to land at Clifden, and his success in attaining his objective despite the handicap due to impossibility of making observa-tions from the stars or to use the radio equipment, is a remarkable feat of navigation

The unbroken silence of the Vickers radio had caused apprehension, not only among the ships far flung across the At-lantic which had been listening for word from the pioneer, but also among thou-sands on both sides of the ocean who had waited expectantly for some flash of news from the speeding 'plane. Harry G. Hawker is credited by the

(Continued on page 746)



Two views of the Vichers-Vimy biplane, powered by two Rolls-Royce motors, which made first successful non-stop trons-Atlantic flight with an overage speed of 120 miles per he

THE GENERAL PROPERTIES AND USES OF PLYWOOD

By B. C. BOULTON, B. S., A. E.

POR a material combining lightness and strength, wood would be unexcelled if it were of homogeneous structure. In tensile strength parallel to the grain, certain heavy mild steel, and their weight is less than one-eighth that of steel. Sprice, a typical light wood, has a fifth the strength of steel, yet only an eighteenth its weight. The same is true, though to a less degree, of the modulus of rupture, and the compressive strength of wood parallel to the grain. However, the tensile and crustings strength perpendicular to the grain, and the modulus of elasticity in this direction, are but grain, and the modulus of elasticity in this direction, are but a tenth to a trentite of these values. On the other hand, the resistance of wood to shear parallel to the grain is many cause of these facts, the utilization of the full tensile strength of wood, or of its high modulus of rupture, is made difficult. This is due to the trouble in holding a member by bolts or similar means, to the large bearing surface necessary to prevent crushing of the wood perpendicular to the grain, or to weakness in horizontol shear.

The chief function of plywood is to equalize the strengths of wood in directions at right angles to each other. This is accomplished by cutting the wood into thin sheets, called veneer, which are then glued together to form a laminated veneer, which are then glued together to form a laminated structure, composed of a central core, or eros-shand, on both right angles to that of the core. These are the outside or face plies in three-ply panels. In multi-ply construction the procedure is the same, except that extra plies are added, an equal number on each side of the core, and every ply is placed with its grain at right angles to that of the layer immediately

Another very important result obtained by plywood con-struction is the practical elimination of warping. In ordinary struction is the practical elimination of warping. In ordinary wood, changes in its moisture content produce shrinkage, which is much greater, proportionally, in a direction transverse to the grain than parallel to it. When this shrinkage is alteration in moisture content on one side, warping occurs. By making the shrinkage in one direction oppose that in the other, properly constructed plywood prevents the difficulties caused by shrinkage. In the more extended discussion that follows is explained the manuer in which plywood modifies the properties of natural wood.

Woods Used in Plywood Construction: On account of the many new uses to which plywood has been put during the war the varieties of woods employed in its manufacture have changed considerably. Extensive testing has brought about the elimination of some species, because of their lack of suitability for structural purposes, and has caused the selection of several of the little used woods for special work.

The species from which most plywood was made before the The species from which most phywood was made before the war are given below, in the approximate order of their importance: Gum, maple, oak, poplar, ash, basswood, bird, manlogany, Several woods, notably spruce; Spanish cedar, and redwood, which formerly were seldom used, have been found to be among the best for meeting the requirements of aeroplane construction. The more important properties for structure of the structure of the selfort of the commercials we trenthe, lifelines, and touchness or resistance to compressive strength, stiffness, and toughness or resistance to splitting. Other qualities which are desirable, but which do not vary greatly in different species, are resistance to distortion, due to variation in moisture content, and ability to take

Some aeroplane parts call for a very strong, tough wood, and one of the heavier species, like birch or maple, must be employed; while other parts require the qualities of lightness and stiffness together with moderate strength, such as is found in varying degrees in spruce, poplar, basswood, and Spanish cedar.

Factors in the Design of Plywood

Symmetrical Construction: The first principle governing the construction of plywood is that of symmetry. On either the construction of plywood is that of symmetry. On either side of the center layer or core there must be an equal number of piles. The number of laminations in plywood must therefore be always odd. For each by on one side of the core there must be a corresponding ply in the same relative position on the opposite side of the core. Both such plies must be of the same thickness and same species of wood, preferably, cut in the same manner, that is, by a rotary cutter, silter, or veneer saw. Furthermore, the grain of two layers, which are both the same distance from the core, must run in the same direction. The reasons for this manner of construction are in the

tion. In reasons for this manner of construction are in the main connected with the phenomena of shirnkaged, between the shrinkage parallel to the grain and that perpendicular to it, is tresses will always be set inp or released in physicol when its moisture content is altered. Considering a three-ply panel, for example, if the humidity increases the core will tend to expand transversely, but since it is rigidly gloud to the face plies, in which the grain is at right angles to that of the core, this transverse swelling is checked, on account of the fact that the face plies do not deform appreciably in a direction parallel to their grain. They are therefore put in tension. In a similar way the face plies would expand in a direction perpendicular to their grain were they not restrained by the core, thereby being put under compression. Each one of the three plies is thus subjected to tensile stresses parallel to its grain, and to compressive stresses transverse to its grain.

grain, and to compressive stresses transverse to its grain.

The application of the principle of symmetry will prevent warping, for it is evident that if the face piles, or with multiply wood all pairs of corresponding, intermediate plies as well, are of the same thickness density and species, and have well, are of the same intexness density and species, and have their grain running in the same direction, the stresses on either side of the core will be balanced. However, should similarly situated plies be of unequal thickness or character, or not have their grain parallel, either cupping or usisting of the panel will occur. Because of these facts, it is clear that in sanding plywood care must be exercised to sand both faces

An extreme example of distortion results when one of the faces of a thin, three-ply panel has its grain perpendicular to faces of a thin, three-ply panel has its grain perpendicular to that of the other face ply. If such a panel is dried, it will card up almost into a cylinder with let ply whose grain is now the ply whose grain is the ply whose ply at an angle of 45' to that of the other face ply, will cause another extreme case. A change in moisture would bring about a twisting or carling up of such that of the other face ply, will cause another extreme case. A change in moisture would bring about a twisting or carling up of such a panel in the direction of one of its diagonals.



Fig. 1-Examples of Distortion caused by improper construct

Fig. 1 shows both types of deformation, and Fig. 2 the manner in which the amount of distortion is measured.

This discussion makes evident the necessity for having the grain of adjacent plies as exactly at right angles as is prac-tical. Furthermore, to reduce shrinkage stresses to a minitical. Furthermore, to reduce shrinkage stresses to a minimum, it is destribed that the moisture content of the plywood, when the property of the property of

with the species or combination of species used. It is also dependent on the relative thickness of the different plies and the number of plies. A series of 54 shrinkage tests were made the number of plies. A series of \$4 shrinkage tests were made recently by the Forest Products Laboratory on combinations of ten of the more common species of wood. The average of the order of the common species of wood. The average of the common species of the common species of the com-dry condition was 35 per cent parallel to the grain and 36 per cent perpendicular to it. Individual results ranged from 2 to 10 per cent, and from 3 to 12 per cent, respectively. These values should be contrasted with shrinkage, under the same conditions, of 85 per cent for flat-sawn boards and 45 per cent for quarter-sawn lumber, which are average values for 150 species.

Number of Piles: Several factors must be considered in determining the number of piles it is best to use. The most important effect of increasing the number of piles is to make the plywood more homogeneous. Its strength in both bending and tension in the direction of the grain of the face piles is raised, until the strength in each direction are nearly equal. Hence, the three-ply type is best if much greater strength is desired in one direction than in another. Approximate equal-can also be accomplished by properly proportioning the core thickness. However, in resistance to splitting action, such as is needed when plywood is fastened by screws near its edges, the three-ply can never be made to equal the multi-ply constraints.

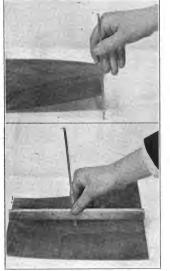


Fig. 2-Methods of measuring the cupping and twisting of plywood

In general, whenever a joint is made between two thick laminations which have their grain at right angles, there exists a tendency to weakness along the joint. This is also the case with plywood made up of heavy veneer, and is due at least in part to the greater shrinkage stresses that occur with thick plies. The use of fairly thin plies renders less likely the development of weakness along a joint.

Another consideration that is sometimes the controlling factor in deciding on the number of laminations, is that the extra glue required where many thin piles are used adds very appreciably to the weight. This point should always to be controlled to the weight. This point should always to wood remain very flat, multi-ply construction is advisable. The reason that distortion is practically eliminated is that the shrinkage stresses are more nearly equalized.

Lastly, certain commercial reasons may affect the number of plies. Of these factors, the principal one is the extra labor entailed in the multi-ply type of panel. In certain instances, particularly where the total thickness of the plymood is small, the maximum number of plies is limited by the minimum thickness to which it is practicable to cut veneer. This writes with the hardness of the wood, the closeness and nature of its grain, and the method employed in cutting the veneer. For rotary cutting 1/48 in, is a usual minimum, and for sticing 1/64 in. Because of the difficulties in handling very thin veneer, the width of such sheets are usually limited. Species of low density and open structure cannot as a rule be cut less than about 1/32 in thick.

than about Tyse. In 2016 Thickness: As suggested before, the attempth of plywood in directions parallel and transverse to the grain of the face plies may to a large extent be modified by the ratio of the core to total thickness. The term core is here meant to include all the layers whose grain runs perpendicular to that of the faces. The purpose for which the total thickness. For example, to obtain the same tensile strength in each direction, the core should be 5-the plywood thickness, while for equal strengths in bending this proportion should be 2. However, the presence of strinkage stresses may introduce an uncertainty that upsets any calculations. A nay tendency to distortion.

Low Density Species for Cores: The strength of a panel subjected to tensile extresses parallel to the grain of the face is independent of the nature of the core. On the other hand, the modulus of rupture and the column strength may be very largely affected, owing to the fact that these properties are proportional to the moment of inertia of the cross-section of the panel. Of two cores, equal in weight but differing in density, the low density core will be the thicker, and hence density, the low density core will be the thicker, and hence could be considered the control of the panel. Of two cores, equal in weight but differing in the control of the panel. Of two cores, equal in weight but differing in density, the control of the control of the panel. Of two cores, and the control of the panel of the panel of the panel of the face piles, secured by using a thick, low density core of basswood or poplar, will add appreciably to the column strength parallel to the grain of these piles. It should be carefully noted, however, that this increase in strength is due not to the character of the wood in the core.

not to the character of the wood in the core.

In general, for large column strength the face plies should
be thu, and of a strong wood like birch or maple, and be
separated as far as possible. This same disposition of material will add to the resistance of the plywood to cupping
and twisting.

In this connection the Forest Product Laboratory found from its tests that panels constructed of low density woods were less inclined to distort than those built up of species of high density. This slightly greater tendency to warp must be balanced against the better structural characteristics of a panel with strong face piles. It might also be added that tests have indicated no difference in the tendency to wdrp of wood cut by a slicer or rotary cutter, but sawn veneer will usually warp the

Total Thickness of Panel: Several thousands of tests on physood of eight thicknesses, varying from 3/30 in. to ½ in. total, and including all the common species, give data on the effect of panel thickness upon the various physical properties of plywood. All the specimens in the tests were of rotary cut same thickness. It was shown that the panel thickness has no effect on the unit, tensile strength. That portion of the material in which the grain was perpendicular to the direction of stress for the most part influenced the strength wery slightly times as great as that transverse to the grain. was 1½ to 2.

Tests on the column bending modulus (P/A+My/I), a property analogous to the ordinary modulus of rupture for bending, brought out somewhat different results. When the load was applied perpendicular to the grain of the face plies and the state of the property of the state of the

ried was found to follow the law for slender columns and was proportional to the cube of the panel thickness, and the square of the column length,

Those tests made on panels constructed of two species of wood in combination demonstrated that the properties of plywood panels in the direction in which the load is applied are dependent entirely upon the character of the plies whose grain dependent entirely upon the character of the piers whose grain is parallel to this direction. For instance, irrespective of entering the properties of the p grain of the face plies the properties will all be as low as if the face plies were of no stronger wood than the core.

Resistance to splitting, as determined by the total work per inch thickness necessary to cause failure, increases to a cer-tain extent as the panel thickness becomes greater. This property is of importance if screws or nails near the edge of plywood must be relied upon to hold it securely.

The cupping and twisting of a panel, of a thickness greater than ¼ in., is small and nearly constant. But with decreasing thickness the distortion grows large and variable.

Glued Joints and Splices

The Forest Products Laboratory has also conducted a mim-The Forest Products Laboratory has also conducted a num-ber of tests on hiree-ply panels made up of 170 in. bastwood and sugar maple veneer, to determine the most efficient types of splices and joints. Two series of tests were made. In the first series two kinds of joints were employed, the diagonal butt and the simple searf. Some of the panels had a diagonal butt joint in both faces, and some in the core only. For this first series the searf joints were call in the core. In the second nrst series the scart joints were all in the core. In the second series of experiments splices were made in one face ply only. They were of three types: the simple scarf, the diagonal scarf, and the saw-tooth butt joints. All tests were made in column bending, as shown in Fig. 3, the results being expressed in terms of the column-hending modulus. All the panels in the first series were $S \times 12$ in; those in the second set, $S \times 20$ in. The panels were all tested with their long dimension parallel to the direction of the load,

Effect of Slope: The experiments on all-maple panels with a diagonal butt joint in each face indicated that the strength of such a joint increases progressively with its slope. For example, when the slope was 4 to 5 the efficiency of the joint was 20 per cent. This was brought up to 5 per cent. when the slope was 12 to 5. In the case of the all-basswood panels, the corresponding efficiencies for slopes of 4 to 5 and 2 to 5.



Fig. 3-A plywood column ready for test

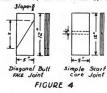
were 41 per cent. and 100 per cent., respectively. In these two sets of tests the load was applied parallel to the grain of the face plies.

With the maple panels in which a diagonal butt joint was used in the core the efficiency, with a slope of 4 to 5, was 86 per cent., and it increased to 100 per cent. with a slope of 8 to 5. In the case of basswood panels, however, 100 per cent.

510 3. In the case of to asswood panels, however, I/W per cent. efficiency was obtained with the minimum slope of 4 to 5. A simple scar! joint in the core having a length of 7 in, which gives a slope of 1 to 11, had an efficiency of 88 per cent. for both maple and basswood panels. Had the length of the scart hean 1½ or 1½ in, the joint would very probably have been 100 per cent. efficient. In all of these tests made on core splices the load was applied parallel to the grain of the core

ply.
For the second series of tests the simple scarf joints were 42, 154 and 2 in. long, corresponding to slopes of 1 to 12, 1 to 20, and 1 to 30. All the panels in this series had basswood per cent. effectint, the 145 in. point 39, per cent., and the 2 in. joint 100 per cent. The corresponding joints with basswood faces were 40, 100 and 100 per cent. efficient. When a diagonal scarf joint in 11 in. long was used, the efficient content of the somewhat as the slope of the joint became greater, but in several shown with subsequent to the slope of the joint scare from the start of the scare from the slope of the joint scare from the slope of the joint scare from the slope scare. Not until the scare from the slope scare from the slope scare.

neither the maple nor the basswood panels did the diagonal scarf show any improvement over the simple scarf. Not until the slope was 12 to 5 did this joint give 100 per cent. efficiency. The general results of tests on saw-tooth but joints were the same for both maple and basswood panels. A joint in which the ratio of width of tooth at the base to length of tooth was 5 to 5 proved to be about 40 per cent. efficient, and as the ratio was decreased to 5 to 13 the efficiency rose to 80 as per cent. In every test made on this type of joint failure



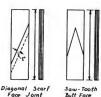
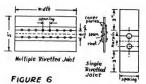


FIGURE 5



Butt Face

occurred in the glue. With both the saw-tooth and diagonal butt joints there was always a strong tendency for the point to separate from the core that was particularly noticeable in

panels having maple faces.

In summarizing this discussion, it may be said that the saw-tooth joint is the least satisfactory of any of the types investigated, while the diagonal butt joint is not as good for most purposes as the simple scarf joint. The latter is superior to the diagonal scarf and can be made 100 per cent. efficient. most effective length for a simple scarf joint in a 3/16 in. panel is 1½ in., which corresponds to a slope of 1 to 25. Figs. 4 and 5 illustrate the various kinds of joints tested.

Riveted Joints

Before it had been demonstrated that glued joints were much more satisfactory, except in special cases, than riveted, plywood joints extensive tests had been conducted on this type. But a brief discussion will be given of the results of this work. When the spacing of the rivets and the width of the margin preciable effect on the strength of the joint. Since, however, preciable effect on the strength of the joint. Since, however, small rivels give their best values for a close spacing, a larger number of them is necessary. This causes much extra work when the smaller sizes are used. On the other hand, the largest rivets require only a third the number of holes and yet make as strong a joint. They are therefore generally to be recommended.

As a material for rivets, aluminum has the advantage over copper or steel due to its lightness, malicability, and the fact of the comparison of the contract and the content of the margin, or distance between the joint and the center line of the row of rivets, should be not less than 13½ in. A margin of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended if the grain of 13½ or 2 min s recommended in the gr of the faces is perpendicular to the seam. For .15 in, copper rivets the best results were secured with ½ in, spacing and 1 in, margin. Fig. 6 illustrates the single and multiple-rivet

types of joints tested.

types of joints tested.

All of these tests were made on joints with either a single rivet or a single row of rivets. For this reason no conclusions can be drawn or recommendations made relative to joints in which two or three rows of rivets are used. The kind of joint investigated was the butt type with two veneer cover plates. Veneer cover plates are probably best, though where the joint is exposed, the air resistance can be reduced by the use of sheet aluminum and by countersinking the holes so that the rivets will not protrude. The finished joint may be covered with cloth, glued on and varnished. When the grain of the outer plies is perpendicular to the seam the effi-ciency of the best riveted joints is about 30 per cent.; when the grain is parallel to the seam this value rises to about 50 (To be continud.)

Functions and Organization of National Advisory Committee for Aeronautics

Washington, D. C .- At a meeting of the Executive Committee of the National Advisory Committee for Aeronautics, held

on May 20, the following plan of organization was approved: The Executive Committee shall have six sub-committees, to be known as standing

committees on

(a) Aerodynamics, (b) Power Plants for Aircraft, (c) Materials for Aircraft,

(d) Personnel, Buildings, and Equip-

ment, (e) Publication and Intelligence,

(f) Governmental Relations.

These standing committees may, from time to time, appoint special sub-commit-tees with the approval of the Executive

The functions and membership of the standing committees shall be as follows:

Functions.-The functions and duties of

Functions.—The functions and duties of this committee shall be:

1. To aid in determining the problems relating to the theoretical and experi-mental study of aerodynamics to be ex-

perimentally attacked by governmental

and private agencies;

2. To endeavor to coordinate, by counsel and suggestion, the research and experimental work involved in the investigation of such problems;

3. To act as a medium for the interchange or information regarding aero-dynamic investigations in progress or

proposed: 4. The committee may direct and conduct research and experiment in aerodynamics in such laboratory or labora-

tories, either in whole or in part, as may be placed under its direction: The committee shall meet from time

to time on call of the Chairman, and re-

to time on call of the Chairman, and re-port its actions, and recommendations to the Executive Committee. Cryptosication.—Chairman, Dr. John F. Cryptosication.—Chairman, Dr. John F. Annes, I. Vice Chairman, Dr. John F. Colonel T. H. Bane, U. S. A.; Lient, Col. V. E. Cark, U. S. A.; Dr. A. F. Bahm, Lieut, Commander J. C. Hunssker, U. S. N.; Dr. L. J. Briggs; Mr. M. D. Hercey; Mr. F. P. Warner, Sercetary, Physical Committees and the committee of the com-traction of the committee of the committee of the com-traction of the committee of the committee of the com-traction of the committee of the committee of the com-traction of the committee of the committee of the com-traction of the committee of the committee of the committee of the com-traction of the committee of the commi

this committee shall be:

 To aid in determining the problems relating to power plants for aircraft to be experimentally attacked by governmental and private agencies;

2. To endeavor to coordinate, by counsel and suggestion, the research and extion of such problems:

3. To act as a medium for the interchange of information regarding aeronautic power plant investigations, progress or proposed;

4. The committee may direct and con-duct research and experiment out aero-nantic power plant problems in such lab-oratory or laboratories, either in whole or in part, as may be placed under its direction;

The committee shall meet from time to time on call of the Chairman, and report its actions and recommendations to the Executive Committee.

the Executive Committee.

Organization—Dr. S. W. Stratton,
Chairman; Mr. L. M. Griffith; Professor
George W. Lewis; Major George E. A.
Hallett, U. S. A.; Mr. J. G. Vincent; Mr.
Harvey N. Davis; Dr. H. C. Dickinson,
Acting Secretary; one member to be nominated by the Navy Department.

MATERIALS FOR AIRCRAFT;
Function—The functions and duties.

Functions.—The functions and duties this committee shall be:

1. To aid in determining the problems relating to materials for aircraft to be experimentally attacked by governmental

and private agencies;

2. To endeavor to coordinate, by conn-sel and suggestion, the research and ex-

perimental work involved in the investigation of such problems; 3. To act as a medium for the inter-change of information regarding inves-tigations of materials for aircraft, in prog-

ress or proposed; 4. The committee may direct and con-duct research and experiment on ma-terials for aircraft in such laboratory or laboratories, either in whole or in part,

as may be placed under its direction; 5. The committee shall meet from time to time on call of the Chairman, and re-

to time on call of the Chairman, and re-port its actions and recommendations to the Executive Committee. Organization—It: S. W. Stratton, Organization—It: S. W. Stratton, The Committee of the Chairman of the Committee of the Chairman of the Chairman of the U. S. A.; Lieut, Commander I. C. Hun-saker, U. S. N.; Mr. H. L. Whittemore, Aring Severtae, BUILDINGS. AND FOUNDAMENT.

Functions. The functions and duties f this committee shall be

1. To handle all matters relating to personnel, including the employment, pro-

motion, discharge, and duties of all employees and others assigned to the com-

mittee for duty;

To consider questions referred to it and initiate projects concerning the erection or alteration of buildings and the equipment of buildings, offices, etc.; To meet from time to time on call

of the Chairman, and report its action and recommendations to the Executive Com-

4. To supervise such construction and equipment work as may be authorized by

Organization,—Dr. Joseph S. Ames, Chairman; Dr. S. W. Stratton, Vice Chair-man; Professor Charles F. Marvin; Mr. J. F. Victory, Secretary. I. F. Victory, Secretary, PUBLICATIONS AND GENCE:

Functions.-The functions and duties of

this committee shall be:

1. The collection, classification, and diffusion of useful knowledge on the subject of aeronautics, including the results of research and experimental work done in all parts of the world;

2. The encouragement of the study of the subject of aeronautics in institutions of learning:

Supervision of the Office of Aero-nautical Intelligence;
 Supervision of the foreign office in

5. The collection and preparation for publication of the annual report and its appendices.

Organization.—Dr. Joseph S. Ames, Chairman; Professor Charles F. Marvin, Vice-Chairman; Miss M. M. Muller, Sec-

GOVERNMENTAL RELATIONS

Functions.-The functions and duties of this committee shall be:

1. Relations of the committee with Executive Departments and other branches of the Government; 2. Governmental relations with civil

arrencies Organization.-Dr. Charles D. Walcott, Chairman: Dr. S. W. Stration; Mr. J. F.

ictory, Secretary. Due to the reduced activities of the Air

ervice it has been necessary to report all class 3 officers who have been approved for the examinations. These are being surplused to the Air Service and available for assignment to other activities, but it is hoped that further Air Service legislation may permit the return of these men to duty with the Air Service.

THE GRAHAME-WHITE SPORTING AEROPLANE

THE feature which impresses one most on first seeing this Grahame-White model, to which the name of the "Bantam" has been given, is its extremely small size. The span of the G.W. "Bantam" is only 20 ft, and its over-

G.W. "Bantam" is only 20 ft, and its over-all length 16 ft, 6 ins, so that it may be housed in a very small shed. The small-housed in a very small shed. The small-mer evident from an examination of one of the accompanying illustrations than it would be possible to convey by any quo-table of the small shed in the small shed to the small shed in the small shed machine, the wing section having been designed with a view to fairly high lift in fact, however, the maximum speed is quite good—about 102 m.p.h. at loom attitudes and 90 m.p.h. at 1000 ft. Ab. which is not a bad performance, especially as the climb appears to be very good.

this is not a pad performance, especially as the climb appears to be very good. The landing speed is about 40 m.p.h. As regards her handling in the air, she appears capable of practically all the evolutions performed by the higher-powered machines, although her lower power naturally does not allow of such steep climbs or prolonged "Zooms" as may be tackled with immunity in single-scaters designed



The 80 h.p. Grahame-White "Bantam"

for military purposes and fitted with engines of three or four times her power. The machine is very sensitive on the con-trols, both laterally and longitudinally. This is, presumably, due to her small mo-

ments of inertia around all three axes, and to the general compactness of the machine.

The general specifications of the Gra-hame-White "Bantam" are as follows: General Dimensions

0

Some constructional details of the Grahams-White sperting medel.—1. The sper box and lug for altachment of Interplanes strut. 2. The wiring plate and secket for tubular compression of the state of the structure of the structure of the structure of the state of the

ltord, upper plane	4' 6"
hord, lower plane	3' 6"
Overall length	16' 6"
Areas	Sa. ft.
pper main plane	83
ower main plane	47
Vilerons, each	8
stabilizer	19
levators	10
in	3.75
dudder	5.5
Weights	Poweds.

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oad per	square	toot.			2.2	7.51
)isposab	le load (apart	from	fue	:1)	200

Performances Speed at low altitude 102 M.P.I Speed at 10,000 feet.... 93 M.P.H. 40 M.P.H.

Speed at 10,000 teet. 93 M.P.H.
Landing Speed 40 M.P.H.
Tauk capacity, hours 2.3
Constructionally the G.W. sporting
model shows many detail features that are
of interest, some of which we have illustrated in the accompanying sketches.
The object which the designer, M. E. Boudot, has kept in mind in getting out the dot, has kept in mind in getting out the details is simplicity and ease of manufacture. The construction of the wings follows more or less standard practice as regards the details. The spars, which are of I-section spruce, rest in mild steel boxes to which are attached the lugs for the interplane strnts, and also the wiring plates and sockets for the compression tubes of the internal bracing system. In the accompanying set of sketches Fig. 1 shows one of the top plane front strut attachments. The spar box has riveted and brazed to it the lug for the interplane strut, and is extended inwards to form the strut, and is extended inwards to form Two vertical holts secure the box to the spar, while the wiring plate for the inplates and sockets for the compression ternal drift bracing is attached to the spar and to the box by two horizontal bolts. (Fig. 2.) A somewhat unusual feature of the top plane is the position of the rear spar, which is a good deal farther forward than is the custom. This is done in order to make it clear the pilot where it crosses the fuselage.

The top plane runs straight across from tip to tip without any dihedral, and is attached to the top of the fuselage by a very strong box-like structure, covered in with the rear of the body and containing the main fuel tank. The rear face of this box serves as a support for the instrument

board. The fuel service tank is enclosed in the center of the top plane.

The bottom plane is built in two halves, each attached to the ends of two short lengths of spars permanently fitted under the bottom of the fuel tank. The front sand rear chassis struts, while the rear spar attachment coincides with and is part of the rear chassis strut, fitting. The bottom plane spar fittings are of the same type as those of the top plane. Fig. caternal view, In principle if it, the same

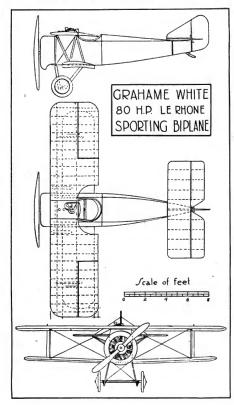
as that shown in Fig 1, but the lug has a commodation for two interplane struts, the struts being arranged in this machine clliptical section steel tubes. This same N formation is also found in the lift before the structure of the structure of

The fuselage is of the usual girder type, with longerons of rectangular sections solid ash. The struis are verifical in the rear is of solid wire. In the front part, that is from the pilot's seat forward, the body struis are arranged as a serie of triangles of the fuselage is flat, but the top is surmounted by a turtle back, and the sides are slightly rounded off alt and more merge into the circular shape of the cowl. The sides are rounded off with longitudinal stringers, which are attached direct disastrongers, which are attached direct turn is more pronounced, they are secured to light three-ply formers. The surface of the cowl.

The controls are of a very neat type, and are illustrated in some of the accompanying sketches. The details of the universal joint of the control tacked are some-versal joint of the dash in front of the plot are mounted a very complete set of instruments, conveniently arranged. The versal joint of the control tacked are some versal joint of the control tacked and further lightened by circuity as the control tacked and further lightened by circuity as tell and further lightened by circuity as tell and further lightened by circuity as the control tacked and further lightened by paymaind of channel section members bolted to the main engine place and carrying at their rear engine-shear is forted, but later it is shear to be a some control tacked and the control tacked and tacked a

recommend it.

The undercarriage is a simple Vee type, with struts of stream-line section steel tubes. The manner of attaching these struts to the body is shown in one of the accompanying sketches. A very stout eye-bolt passes through the bottom longerons (Continued on page 733)



THE NAPIER "LION" 450 H. P. AERO ENGINE

S will be seen from the illustrations the A Lion aeromotor consists in the mass of three groups or "banks" of four cylinders each, mounted "broad-arrow" (ashion at that angle to one another which, in the four-stroke cycle, has been found the most appropriate for ignition with but the most appropriate for ignition with but two magnetos, in the requisite range of advance and retard. In type it is just on the short-stroke side, the bore being 5½ ins., and the stroke 5½ ins.; the normal speed in r.p.m. being such as to sustain best the approved normal propeller speed, as effected by the reduction gearing, with a visible acceleration, so it is understood, above that normal, for the higher altitudes.

In the original serial issue, each group of four cylinders was water-jacketed, monoflux fashion, although each cylinder was formed then as now, as a unit machined from the solid steel forging. now each cylinder is separately water-jacketed as well, the thin steel water-jackets being formed of sheet metal pressings, united in vertical welded scams back and front, and welded to cylinder flanges at the top and bottom of the water-spaces in a slightly downward tapering formation, the reason for which will be pres-ently apparent. This construction not only eliminates gaskets and leak-rings, but also the adaptors and tapered wedge nuts for the sparking plug bosses of the former monotlux pattern; these bosses former monoioux pattern; these bosses being now not only screwed into the cylinders, but welded in place. It will be noticed that on the induction side, and on either side of the boss-insertions—in each group-horizontal water-connections or spouts are welded into the top of the jackets, in flats pressed therein; and

united with rubber hose-tubings and clips, so as to maintain a direct line waterbottom of the jackets, similar water-unions are likewise formed and united for a direct water outlet runway. But their lessened diameter being additional to the jacket taper, the object of keeping the cylinders warm and thus retaining greater thermal efficiency at all altitudes, is finally attained; this being one of the details of design obviously helpful to-wards the low consumption of the Lion

To bring the cylinder units as close as possible, flats or straights are machined on the foot-flanges, which are held down to the crank-chamber by an adequate number of studs, as well as by three pairs of dog yokes on either side, lapping on the

adjacent flanges.

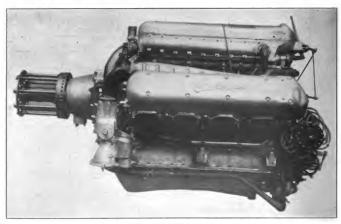
The most original feature of the Lion mass-construction, however, is firstly that mass-construction, nowever, is arrange that the cylinders are not, as in most other models, formed as open barrels, but with crowns, through which four holes are machined for the insertion of paired valve-seatings. Secondly, these crowns valve-seatings. Secondly, these crowns are machined flat so as to fit the underside of the monobloc aluminum casting of the so-called "cylinder head," which is or the so-caned cylinder head, which is actually (a) a stiffening block for the whole construction, (b) a water-recep-tacle for the cooling, by direct convection, of the thin cylinder-crowns, (c) a vehicle for the gas passage, in common manifold on either side, and as a mount for the induction; also (d) in its upper part, as a cradle for the mounting of the entire valve gear of each cylinder group, and as an oil-tight container when its cover is fitted.

The head-block has, of course, a separate water inlet and outlet, the connection in the former case varying according to whether the motor is to be used as a tractor or a pusher. For a tractor both cylinder jackets and head-block are water fed from a small two-way union casting aft, direct from the pump inlet connection, art, direct from the pump inlet connection, the outlets for both being in front; but for a pusher, the feed is first through the inlet-runway of the cylinders, then through a union-casting into the front of the head-block, and then out to the radiator through a pipe bolted to the flange at the rear-end of the head. In other words, the circulation is in parallel for the tractor

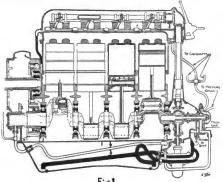
and in series for the pusher.

For attachment of head-block to cylinders, as the third point of this construc-tion, instead of struts or colonnettes, the valve seatings, which are shouldered heavily, are screwed from within the cylinders -as open nuts, so to say-into the base of the head-block; thus to form the inner ends of the gas passages, as unions, and at the same time the strongest of attach-ments, 16 in all. The method of screw-ing in is not material; but the simple ingenuity of the system will be as patent to all connoisseurs of motor-mechanics, as

its effectiveness is-as and when fitted. Those who have reviewed, much more those who have wrestled with the com-plications and encumbrances of induction manifolding will be the first to appreciate Mr. A. J. Rowledge's reduction of the whole proposition to a simple trough-shaped tapered aluminum casting, bolted up to the common induction passage for all four cylinders, the other longitudinal half of which is formed in the head-block. This practice, though previously



The Nanier "Lion" 480 H.P. aero engine



Sectional elevation of middle group of cylinders, shawing lubrication system. The return or scavenger leads are in black

employed for the exhaust of smaller motors, is new for induction; and both theoretically and practically in better than theoretically and practically in better than casting, as promoting the cleaner coring and accurate water-wall thickness essential in so powerful an aeromotor. Its the gas velocity and consequent full charging to the rear cylinders; not so well achieved even by the American endless and the commitment of end-minons.

In this case the connection forwardor the right hand and vertical group, looking forward-is by two induction trunks, hot water lackeed from the headlocks, with serial water connections the Holson carburctor; a similar inductionlead construction to a single N.S.1 carburctor of the same made, serving for the left-hand group. In all three, the water the water pump inlets.

As to the carburetor control, suffice it to say that since forced induction for high altitudes is inappropriate, if not impossible in such a motor-design generally, the simpler—and only—alternative of petrol diminution is employed, and is effected by a certain method which more nearly equalizes the pressure in the mixing and float-tchambers.

A further feature of the induction is the gas starter. Reference to the illustrations will show a connection set into the rear end of each induction passage cover. Each of these runs to the way of a four-way distribution and equalizing so a storted, firstly, that it opens to each of the three induction connections in turn, while constantly open from the fourth connection; and secondly, so that, in the fourth or equalizing position of the control lever, it gives free communication while closing off the fourth connection and while closing off the fourth connection from the charging apparatus.

This last is a pipe running to a two-way cock set in the inter-consections of a special vaporizer and air pump device, which is mounted independently of the motor, in any convenient position in the convenient position in the property of the

from the pump through the vaporizer, likewise passes the resulting explosive mixture from the latter to the distributor; so that each group of cylinders in turn can be charged with mixture impelled by the pump, when the motor may be fired by the hand-starting magneto.

The air point in its office coolings's handoperated double-acting type, with leather faced, spring-controlled inlet and outlet valves at each end; while the atomizer consists essentially of a carburetor-coning a horizontal syray jet beneath its choke tube, to which the petrol supply is controlled by a quadrant-set needle-valve. controlled by a quadrant-set needle-valve shaped mixing chamber containing four mixing the properties of varying mesh, mounted one above another. In the way all reference to the controlled way and the controlled to to the tank or a waste-pipe; and the whole to the tank or a waste-pipe; and the whole quadrant, is contained in a pot-like jacket, quadrant, is contained in a pot-like jacket.

As for the exhaust, the single outlets from each cylinder are given any kind of manifold that suits the installation.

Coming now to the valve gear, this consists for each group, of two hollow camshafts, the cams of which act direct upon the adjustable lappet-heads of the valves; one that actuating the two inters and the They are mounted in brome bearings, in five cross webs in the cradle part of the head-block. One shaft is spur-gare driven off the other, in all three sets. Looking is the inter camshaft that is so driven, inwardly of the V, while in the vertical group is the exhaust camshaft.

The drive to the right and left groups is effected through bevel gearing from vertical drive-shafts—which for constructional assembly and dismounting purposes are in two parts, sleeve-united—mounted in long bronze sleeve-bearings at the top-around the union-sleeves, and at the bot-

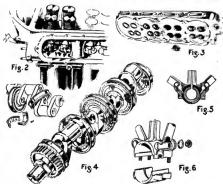


Fig. 2—Induction aide of head-block. Fig. 3—Under side of head-block. Fig. 4—Crankshaft assembled with bearings. Fig. 5—Big end lubrication detail. Fig. 6—Big end construction

tom, above their driving bevels; each being enclosed within a tubular sleeve and lower encasement which constitutes a return for the excess valve-gear lubrication. Naturally, with the camshafts laid equidistant from the longitudinal axis of the head-block, the drive-shafts are off-set head-block, the Grive-snais are out-so from the cylinder axes of each group to an appropriate angle. Also, the center one drives a tachometer, and the right-hand one a Remy distributor at half motor-speed; in both cases through skewgearing located beneath the union-sleeves. The valves, which are not interchange-able, the thickness of their stems differ-ing, have wide hollow stems into which the tappet heads are screwed.

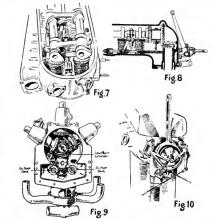
The distribution gearing, which is car-ried inside two castings bolted together, and to the back of the crank-chamber to form a detachable unit, is actually in two divisions. The first, that of the valve gear, consists of bevel gearing; the main driving bevel on the crankshaft engaging the drive-shaft bevels of the right and left hand groups, while a second bevel on the latter drive-shaft engages the driveshaft bevel for the vertical group. This arrangement is manifestly necessary, as there would be no space for a third direct driven bevel among these smaller intermediate transmissions, in a progressive reduction to half speed, as between the first main drive bevel and the final driven bevels on the camshaft.

beveis on the camshatt.

The second part of the distribution is from a one-piece double reversed bevel keyed upon a hollow extension-shaft; which is dog clutched into slots milled on the hollow crankshaft end and attached thereto by an open threaded ring enclos-ing both dogs and crankshaft end. The ing both dogs and crankshaft end. The forward one of the two bevels engages another on the head of a spindle, which, another on the head of a spindle, which, skew gear driving the two corresponding gears of the oil pumps, and is dog-cutched at the lower end to engage the clutched at the lower end to engage the left to drive the two AVLE BT.H. 12-cyfinder magnetos—at one and a half-ing bevel engages bevel pinions, right and the left of drive the two AVLE BT.H. 12-cyfinder magnetos—at one and a half-ine-adjuxted, leaf-tering combines from ine-adjuxted, leaf-tering combines from nicr-adjusted, leaf-spring couplings from the intermediate pinion shafts to the magneto spindles.

So much for the essential mechanism and general arrangement of externals. The next interesting original feature of the Lion design—actually the most importhe Lion design—actually the most impor-tant component of the starting system— is the interconnected valve-relief control which enables the air-scouring and mix-ture-charging to be effected. This con-sists essentially of a set of T-shaped de-pressor-levers, four for each set of cylin-ders, which are anchored through lugs behind their shank-parts, to lugs beneath the the comback bearing so that their T the camshaft bearings so that their heads hear upon the tappet heads of the two forward valves of each cylinder; while the free feet of the shanks engage while the free feet of the shanks engage slots in a five-jointed spring-loaded pull-rod lying along the middle line of the valve-gear cradle at the bottom, with its rearward end brought through a bush in the cradle-end.

Now in the vertical group, this end of the rod carries a two-faced sheave-like collar, the inner face of which is engaged by the fork of a control-lever-anchored beneath to a hracket-arm on the head-block end—which, pulling out the rod, causes the T-pieces to depress the valves against their spring-pressure. At the same time the outer face of the collar engages the free arms of bell-cranks—also anchored to the head-block-the other arms of which are adjustably jointed to rods



t cylinder. Fig. 8—Starting gear valve control.

connected to other bell-cranks, likewise anchored to the right and left head-block ends, and engaging the ends of similar pull-rods actuating the depressors in those

valve-gear cradles.

Recollections of the original Panhard auto-starting system-on the same chargeauto-starting system—on the same charge-pumping principle generally—of later adaptations of similar systems for high-powered motors; air-bottle practice and so forth, might convey the impression that the charging in this instance was up to some degree approaching normal pre-combusion pressure. For while it is obvious that the exhaust valves must be held open for the air-flushing, it is equally clear that while they remain open, no charging with mixture above atmospheric pressure can be effected, as any such charge would escape. Again, there is the equalizer, sug-gesting its own function, as apparently to establish an equal charge-pressure in all cylinders alike.

Both the impression and suggestion are all the more plausible that in a vertical or even a V-type, however mechanically halanced or roller-borne as to its crankshaft, some such arrangement, with charging at three atmospheres or so, would probably be essential,

Nevertheless—none of them happens to apply! The facts, on the contrary, in this case are, first, that apart from the complication of having—as the only prac-ticable method in the circumstances—to lift the equalizer cut-off sleeve to some position in which it cut out all four connections, its equalizing function does not apply at all for the operation of charging, but solely-and essentially, in default of such a total cut-out-for subsequent run-In hrief, it acts as a junction-point for a kind of perpetual triplicate connec-tion constituted by the three pipings, pre-

cisely like the far end of a three-way "shorehaul" induction. Secondly, the grouping of the cylinders being not even at a V, but at the greater famisies angle, the connecting-rod thrust angle upon the shaft is so much greater, and bears as from so many more radii at a time, that what with the reciprocatory-weight mechanical balance and the roller-borne chanical balance and the roller-borne chanical balance and the roller-borne crankshaft suspension in further aid, the series of slight explosion efforts of charges ignited at merely atmospheric pressure have been found sufficient for starting. Consequently to effect a start, it is merely necessary to hold back the control lever as far as it will go. Then the cylinder groups, one after another, are the cylinder groups, one after another, are flushed with air: next—by the operation of the two-way cock—they are charged with mixture impelled from the pump, and merely filled with it; the lever is let go and the valves closed; and finally, the equalizer level is set in the equalizing position for all subsequent running-induction, and the motor is ready to be started on the hand-operated magneto.

Internally, the chief features of the Lion motor are the crankshaft, with the special method of fitting roller bearings on the three intermediate journals: the connecting rod fitting; and the internal sump-scavenged lubrication for which all these parts and the valve-gear generally act as conduits; the only external piping being the two rearward scavenging connections from the sump to the pump, an upward connection to the valve-gear, and a third one forward to the propeller reduction

The crankshaft has its pins and jour-nals hollowed, and closed again by bolt-connected, valve-like plugs to form oil-cells, and its wehs drilled diagonally to form a continuous or serial-feed oil con-

duit from cell to cell. The problem of getting roller bearings on the intermediate journals has been solved—albeit at the compromise of paring the web-faces somewhat heavily, above and helow—in on of slipping the races of outside bearings over the webs, and packing up to them with halved steel bushes, houddered them with halved steel bushes, houddered can be compared to the property of the prope

Committee, the perspecta space security.

The end-journals, of course, present no such difficulties, and owing to the reduction spur-gearing at the end, no thrust-arcs are needed; the roller-bearings being simply housed in the crank-chamber ends; simply housed in the crank-chamber ends; the finer faces butted by the web; and their outer ones, held rearwardly by a keeper plate, and forward by the oli-theower ring which is stud attached to the driving spur gear. The extremity of the housed in the metal of the reduction grar drum. Being hollow, it serves as the entry from beneath of the forward oil-pressure lead, as brought through the sacchamber from the oldrer end; and is seas-chamber from the oldrer end; and is facilitate the flushing of the whole circulatory system with kerosene after every

50 hours flying.

The pistons cast from a certain aluminum alloy, carry four rings on their very short trunks. These are chamfered and bored through beneath the two lower rings—which are scrapers—so as to return all lubricant in the slightest excess into the base-chamber. The gudgeon pins are hollow, and thus form the final oil-consplictpinned set-screw in each case, they

do not oscillate in their steel bushes. Thus the oil-feed is necessarily intermittent, but only slightly so, owing to the slight angularity of the rod-head oscillation. On the other hand, it is frequently argued that the oil consumption is rather greater with a gudgeon pin thus fixed than in one that oscillates with the rod-head.

The connecting rod group in each case consists of a central 1-sectioned—all-but sectioned—master-rod, the big end of which houses a bronne bearing, white-which houses a bronne bearing, white-but consists of the section of the secti

Mechanically, the great distinction between this and similar connecting-rod unions for V, Y or "broad-arrow" type motors, is that the pin-anchorage is neither upon nor near the shank of the master-rod-which is than not subjected to "recking thresse—but is solely upon to "recking thresse—but is solely upon to have been considered, into which the lugs are stoutly rooted, into which the lugs are stoutly rooted, into which

the lugs are stoutly rooted.

As to the librication generally of the Lion motor, thanks to the appropriation by the state of the librication generally of the lower state of the librication of the librica

albeit that proposition is not readily visible. And a further point to note is that the so-called oil-sump is not actually a sump at all, but, what is much better for "dry" librication, an oil-pas sunk towards the ends. Consequently in any case, whatever angle the motor may take, such oil as may be in the pan must go to the seavenger-pipe at one end or the other.

The oil pump itself consists of a body cast in two halves corell for the requisite oil passages, and bored to take six intermething gears arranged in pairs, above diversible the separation of the result of the service of the servic

mounted in roller bearings, housed in the drum-like upward extension of the crankchamber; the propeller shaft, in addition, having double ball thrust bearings, housed inwardly of the outer roller bearing, so as to take all the thrust and allow the full benefit of the rolling-line contact of

as to take all the thrust and allow the full benefit of the rolling-line contact of the thrust and thrus

THE GRAHAME-WHITE "BANTAM" (Continued from page 729)

and through a heavy gauge wiring plate, the outer and of which serve as an an-chorage for the lift cables, and the inner and of which is attached to a steel tube running horizontally across the bottom of the fuselage. Thus, when the machine is owing to the pull of the lift cables, while during landing shocks it is put into compression owing to the angularity of the undercarriage front struts. The details abort longitudinal tube to which the rubber cord is attached. At the point where the struts meet this tube internal reinforcement in provided to afford extre the undercarriage, one in front of the axle and one behind it. These are botted to the classis struts, the botts passing through short lengths of tube weeded into the through the control of the truth of the control of the safe and one behind it. These are botted to the classis struts, the botts passing through short lengths of tube weeded into them transversely. The whole undercarriage is short lengths of tube welded into them transversely. The whole undercarriage is of the margine of the margine.



Front and rear views of the Grahame-White "Bantam"

USE OF ULTRA VIOLET LIGHT FOR TESTING BALLOON FABRICS

By JUNIUS DAVID EDWARDS and IRWIN L. MOORE, Bureau of Standards

Introduction

IT is quite necessary to be able to determine in advance of construction of a balloon the probable resistance of the fabric to the deteriorating conditions of service. Extensive tests made at the Bureau of Standards and other places have shown that reliable indications as to the relative lasting qualities of different fabrics can be obtained by testing after exposure to the weather.

Deterioration from exposure to the weather is due, among other things, to the combined action of light, heat and moisture. These conditions are extremely variable, and as a result ture. These conditions are extremely variable, and as a result tests made during different periods of the year are not comparable. For that reason it is highly desirable to secure a reflect of exposure to heat has been investigated by Edwards. Tuttle and Walen, and it was shown that the relative deterioration of balloon fabries produced by heating was not a reliable indication of their durability in service. Exposure to light from an ultra violet lamp has also been suggested and used for obtaining an accelerated aging test, on the assumption that the ultra violet radiation in sunlight was one of the

tion trait me intra viouet ranianon in sunning was one of the chief factors in the deterioration of balloon fabries. Rosenhain, Barr and Booth! exposed balloon fabries to ultra violet light from a mercury vapor are in a quarte bulb. Two fabries, both of which showed marked deterioration on exposure to the weather for 50 days, were exposed to the ultra violet light for 64 days. The action of the light produced no significant change in permeability in the case of one fabric, whereas there was marked deterioraton in the case of the other

the other.

Victor Henrit has studied the effect of ultra violet light on rubber. Using a mercury vapor arc in a quartz tube placed 20 cm. from the exposing floor, he ran tests on samples of thin alsees of rubber 0.5 mm. thick, He found that unvulcantable became dark and shiny and cracked easily when stretched. The vulcanized sheets took 48 to 72 hours before showing any marked deterioration. He concluded that the addition of compounding agents generally increased the resistance of the rubber to oxidation. Litharge was especially greatly facilitated oxidation. Applying his conclusions to balloon fabrics, he recommends that (1) in their construction there should be no unvulcanized rubber, (2) that the cloth shall be dyed with lead chromate or aniline yellow so as to form, a execut to ultra violet light, (3) that some yellow coloring matter be used in the rubber tised.

Bureau of Standards Tosts

The tests made at the Bureau of Standards were primarily for the purpose of determining the value of exposure to ultra violet light for accelerated aging tests on balloon fabrics, violet light for accelerated aging tents on balloon fabrics. The light source used was a merceny vapor are, taking approximately 600 watts, in a quartz title. This was mounted whole placed in a galvanized iron container through which air was constantly drawn by a fan at the top. Two samples of fabric, Il inches square, were tacked on a frame so shaped that the fabrics were on a L70 arc of a cylinder (radius = II') of which the lamp formed the axis. Kadasion measurements 11) of which the lamp formed the axis. Radiation measurements were made from time to time to determine the total radiation from the lamp and the percentage of ultra violet radiation. The radiation measurements were made by W. W. Coblentz and M. B. Long, and a description of the performance and characteristics of the lamp will be given in another.

report.
Numerous tests of halloon fahrics exposed to the weather Numerous tests or nation rannes exposed to the weather have shown that normal sging is usually accompanied by a slow increase in acetone extract and an initial decrease in permeability which is followed by a very large increase in permeability when the gas find becomes brittle and cracks, the deterioration of the fabric can thus be judged by a comparison of the permeability and acetone extract determined before and after exposure. The permeability was determined

by the Bureau of Standards' method as described in Techno-logie Paper No. 113; the permeability is expressed in liters per square meter per 24 hours. The percentage acetone extract was determined by the method described in the third annual report of the Advisory Committee previously referred to. The results of a series of tests on balloon fabrics after exposure to ultra violet light are given in Table 1. The results of similar tests of the same fabrics before and after exposure to the weather for 30 and 60 days are given in Table 2. A brief description of each fabric is given in the following

tabulation

No. 22151-Two-ply fabric, olive green rubber coating on No. 23987—Two-ply fabric, gray rubber coating on outside.
No. 10690—Two-ply fabric, gray rubber coating on outside.
No. 24580—Two-ply fabric, olive drab dyed fabrie on out-

No. 22151X-Same construction as 22151 but from different

No. 27331-Single-ply fabric coated with fine para rubber and sulphur.

No. 27291—Single-ply fabric, same coating as 27331 except that lamp-black has been added to the compound.

TABLE 1 Effect of Exposure of Balloon Fabrics to Ultra-Violet Light

			F	Acet	abilit one I	y (25	C)	and I	Per Cer posure	it
		Time of Ex-	Orig -inal	43	144	158	16	2	380	194
Fab-		Total Radiation in gm. cal. per sq. cm		1015	2675	2410	13	17	7410	1,578
ric No.	Test	Ultra-violet radiation in gm. cal. per sq. cm.		670	1712	t 495	78	8	4650	896
_		Moisture Condition		Wet	Dry	Wes	Wet	Dry	Wet	Dey
22151	Perm		15.4	13.4						
23987	Perm % Ac. Ex		11.4 1.7	14.6 2.6						
10650	Perm		17.5 1.6		12.5 3.6	11.1				
245%)	Perm		9.4 2.0		8.0 5.5				320. 13.9	1
22151 x	Perm		15.4 2 D				10.1 5.8	12.1 4.8	17,800 15.6	
	% Ac. Ex		1.3							4.7
27331	% Ac. Ex		1.9							16.6

NOTE—dil compler were writedly before tening for permeability by bring don't be metal rich (and) WP) under a contrast lentile did (and) WP) under a contrast lentile did not pound per inch.
The colors gives in the column norical "total cashini" are fee all pays length from 0 to 12\(\frac{1}{2}\)\mathbb{m}. The other is the column marked "alterarrich radiation" are per all more departs from 0 to 64\(\frac{1}{2}\)\mathbb{m}.

For the proper interpretation of the data obtained in these tests it is necessary to consider the character of the radiation tests it is necessary to consider the character of the radiation tests and the property of the pr For the proper interpretation of the data obtained in these

matery netwers the wave engins 0.89a to 0.77a. Measurements on the intercuty are show that the radiation changes in character and intensity during the life of the lamp. At first as high as 70 per cent, of the total radiation was of wave lengths shorter than 0.45a (ultra violet); this percentage decreased steadily with use until finally only about 50 per

^{*} Third Report of the Advisory Committee for Acronautics (1917), t W. Rosenhain, Guy Barr, and Harris Booth, Report of Great Britain Committee on Aeron., 1910-1911, p. 60

[‡] Le Caouschouc et Gutta Percha, 1910-7, pp. 4371-4376.

TABLE 2
Effect of Exposure of Balloon Fabrics to the Weather

		Permeabilit Acetone	y (25° C) an Extract after	d Per Cent Eaporure
Fabric No.	Test	T	ime of Exposu	ite
1		Original	30 days	60 days
2215t	Permeability	15.4 2.2	900. 17.4 11,400	27,000 20.0 21,000
23997	Permeability	11.4 1.7	14.3 3.1 8,600	12.1 3.7 15,600
10650	Permeability. % Acetona Ea	17.5 1.5	19.5 14.4 11,400	8,750 21,8 21,000
24580	Permeability % Acetone Ex. Solar Rad.	9.4 2.0	14.2 2.9 7,400	14.1 5.7 13,400
221513	Permeability % Acetone Ex.	15.4 2.0	6.1 9.1	1.8
2729 t	% Acetone Ex	1.3	t1.5	
27331	% Acetone Ev	1.9	31.	

NOTE—"Solar Reduction" is experied in gram relative per square cruimeter of horizon al surface for more length from 0 to 1.2%. There solars nor NOTE—EL langths were resided before testing for permeability by bring draws tan times over a metal edge (angle 90°) under a courtant tension of one pound per not.

cent. of the radiation was ultra violet. The intensity decreased at the same time until it was only about one-third of the oftginal value.

A consideration of the data in tables 1 and 2 shows that exposure to the ultra violet light produces deterioration comparable qualitatively at least with that obtained by exposure to the weather. It was found, however, that the action of the ultra violet lamp was not nearly as rapid as had been hoped for. For example, fabric No. 2215 showed rapid deterioration in summer weather in less than two events of the production of

Further experiments showed that it required between 1/2 and 3/6 hours' exposure to secure complete deterioration of fabrics Nos. 22151 and 24800. Practically the same result was obtained after 30 days' weather exposure in the case of No. 22151, while the deterioration under the lamp in 300 hours was greater in the case of 24800 than in 50 days' exposure to the weather. Judging from service tests and weather exposure to the weather.

posure tests fabric No. 24580 is far superior to No. 22151 and yet the exposure to ultra violet light shows only a slight difference in their resisting qualities. Even when the amounts of ultra violet radiation were the same in both outdoor and were very different. In the case of fabric No. 22151 the ultra violet radiation from the sun during 30 days' exposure to the weather was 700 calories; during 43 hours' exposure to the weather was 700 calories; during 43 hours' exposure Yet this fabric showed no significant deterioration in 43 hours under the lamp, but was practically destroyed by 30 days' outdoor exposure. Take another example: Rabric Xo. 10500 great deterioration, but was ruined by 60 days' weather exposure. The ultra violet radiation in the first case was 1,400 calories and in the second case 1,300 colories.

Tests were made to determine, if possible, the influence of moisture on the rate of deterroration. In the tests marked "wet" the samples were sprayed with water twice daily. The "wet tests" show a somewhat more rapid action than those made with the fabric dry. That the difference between tests made under the two couditions is not greater is probably due to the fact that the normal humidity of the air in the room is sufficient to maintain an appreciable percentage of moisture

is sinuled the state of the sta

.....

It seems evident from these few tests that the relative deterioration of different fabrics under ultra violet light is no strictly comparable with the deterioration experienced in service clim ordiore exposur. The test of the contraction of the contraction of the contraction of the conexposures made at different times are not strictly comparable; moreover, it is not practicable in most laboratories to measure the radiation from the lamps. The tests are thus far from pared with summer exposure in Washington.

TABLE 3

Comparison of Solar Radiation with Radiation from Quartz
Mercury Lamps

A. Comparison for all Wave Lengths 0 to C

Wave Lengths	Solar Radia		Mercury /	Arc
of Radiation	Washing		Radiati	on
in W	Gram Cal. per	Percent	Gram. Cal. per	Percent
	Sq. cm. per sec.	of Total	Sq. cm. per sec.	of Total
0 to 0.45	0.0008	5	0.0028	12
0.45 to 1.2	0.0121	78	0.0017	8
1.2 to α	0.0026	17	0.0176	80
0 to α	0.0155	100	0.0219	100
В. С	Comparison for Was	e Lengthe	less than 1.2 µ	
0 to 0.45	0.0008	6	0.0026	60
0.45 to 1.2	0.0121	94	0.0017	40
0 to 1.2	0.0129	100	0.0043	100

The values for salar radiation were calculated from data given in the Smithtonian Physical Tablet.

The values for the radiation from the mercury lamp are for a distance of 28 cm, from the quarts tube and are an overage along its length.

EFFECT OF WRAPPING ON THE STRENGTH OF AEROPLANE STRUTS

THE practice of wrapping aeroplane struts or wing learns with canva desuch wrapping increased the supposition that such wrapping increased the strength of the members at critical points, prevented sudden failures, and kept out moisture. Wrapping has been advocated especially for cross-grained material in order to make available for aeroplane construction stock which would otherwise be rejected.

Extensive tests have been made at the Forest Products Laboratory for the United States Air Service to determine the reinforcing value of such wrapping.

These tests were made upon cross-grained struts of Sitka spruce and Douglas fir partly or entirely covered with Bakelized canvas or the standard cotton tape, and upon some of the same struts with the wrapping reproceed.

wrapping removed.

The conclusions reached from the tests were as follows:

The addition of Bakelized canvas to cross-grained struts increases the load somewhat but decreased the load per unit weight; it also increases the deflection and work to final failure and hence the shock-resisting capacity of the struts. Wrapping cross-grained struts with cot-

ton tape according to standard methods has no appreciable effect on their strength, It is doubtful if any other methods of wrapping, such as cording, would increate strength properties very greatly. There is also the probability that any wrapping or covering will be loosened by weather changes.

It is believed that canvas, tape, or cord covering is of less value than the same volume of wood, and since such a covering is likely to be heavier than wood it is of still less value when compared with the same weight of wood.



The AIRCRAFT TRADE REVIEW



National Aeroplane Co. Doing Large Passenger-Carrying Business in Southwest Fort Worth, Texas.—The National

in Southwest
Fort Worth, Texas.—The National
Aeroplane Co., a \$3000000 corporation
Transportation Co. is operating an aerial
passenger service between the following
cities: Wichia Falls, Gainewille, Waco,
Austin off San Antioner Texas, and Article
lined sub-stations and landing fields.
The plans of the corporation provide
or early extension of routes to as far as

Kansas City and Denver, and the success of the project so far makes the directors of the corporation predict that they will be operating a hundred landing fields within a few months.

Chinese Purchase American-Built De Havilands

Toy Gon, former director of the Chinese Air Service and a member of the special commission appointed by the Govspecial commission appointed by the Gov-ernment, has purchased a number of De Haviland aeroplanes equipped with Lib-erty motors. He has also negotiated with certain firms to supply commercial ma-chines. Arrangements have been made for their immediate shipment to China.

Aircraft Factory Equipment and Tools On Sale by Air Service

Washington, D. C .- According to an announcement from the War Department, there is available for sale machine tools used in aircraft production valued at \$11,-000,000. It is expected to dispose of some of these in Europe.

No Radiator Trouble for NC Boats Engine radiators played a very im-portant role in the equipment of the NC scaplanes. Not only were the en-



gines of all these planes perfectly cooled, but indoubtedly the radiator of the NC-3 helped to preserve the lives of officers and crew for it will be recalled that Commander Towers and his men subsisted for mander Towers and his men subsisted for fifty hours upon chocolate and fresh water drawn from the radiators when they came down in the fog this side of the Acores, after flying over 1,000 miles. NC-4, which so splendidly accomplished the record-breaking flight, like her sister ships, did not experience even the sem-blance of trouble with the engine-cooling

During the war the Navy Department used many G & O Radiators. Therefore, when the transatlantic flight was first conceived, naval officers together with the

specifications for the projected voyage. When approval of the specifications was approval of the specifications was approved to the specification was approved to the specification of the specificati

successfully withstood the gruelling test is a high tribute to the radiator equipment.

Personal Pars

Capt. Henry E. Reece and Lieut. Nathan P. Oakes, using a Curtiss II, flew from Providence, R. I., to Washington, D. C., a distance of 448 miles in 300 minutes

Flying a Handley Page on a flight from Elizabeth, N. J., to Ellington Field, carrying four officers and two soldiers, covered the 285 miles between Montgomery, Ala., to New Orleans, La., in 270 minutes.

Joseph Leopold has resigned his posi-tion as sales manager of the Jones-Motrola Co. in order to associate himself in a similar capacity with the Trego Motors Corporation of New Haven.

James A. Wright, W. Ruben Fisher, W. E. Jominy, Albert Harwith, William J. Kurth and L. F. Merritt, all of whom were engaged until recently in the Bureau were engaged until recently in the Bureau of Aircraft production, have formed the Wright-Fisher Engineering Company at Detroit. The company will engaged in the designing of tools, dies, jigs, fixtures, special machinery, automatic licat treating equipment, etc. machinery,

Harry S. Finkenstadt, who enlisted in the aviation corps shortly after the United States' entry into the war, has recently been honorably discharged and returned to Detroit as western sales agent of the Carbon Steel Co., Pittsburgh.

L. R. Scafe, who was comptroller of the Dayton-Wright Airplane Co., Day-ton, is secretary and treasurer of the American Finance Investment Co. of that city.

C. B. Kirkham, formerly chief engineer of the Curtiss Aeroplane and Motor Corporation, of Buffalo, and the Curtiss Engineering Company, of Garden City, L. has opened an office at 15 East Fortieth Street, New York, Mr. Kirkham is acting as consulting engineer for aeronauting ing as consulting engineer for aeronauti-cal companies, and is designing a line of aeroplanes and engines, which he has air mind for some time. He is also work-ing on a plane for the Post Office Depart-ment. Mr. Kirkham is also directing the New York Office of the Deposited Metal Products, of Newark, N. J.



Service Motor Truck Co. delivers parts from Wabash, Ind., to the Firestone plant at Akron.
From left to right: Harold Brooks, H. S. Firestone, W. E., Duersten



Manila Aero Club Demonstrates Aerial Mail to Director of Posts

Manila, P. I.—Flying under the auspices of the Manila Aero Club, Miss Ruth Law of the Manila Aero Club, Miss Ruth Law completed a series of mail-carrying flights before the Director of Posts and govern-ment officials. Plans for the establish-ment of a training field have been com-pleted and arrangements for the purchase

of planes are being made.

Official conferences have been held and the advantages of aerial mail for linking up the island demonstrated. Miss Law stated to the postal authorities that landing fields at intervals of perhaps ten miles will be required.

Aero Mail Service Between New York and Chicago Starts Next Week It was announced by James B. Corri-don, superintendent of aerial mail service of the Post Office Department, that the New York-Chicago aerial mail route will be placed in operation next week. At the same time the New York-Washington service will be transferred to Newark, which will be the eastern terminus of all aerial mail routes.

aerial mail routes.

The inauguration of the Chicago route from this field and the change of terminus for the Washington route, Mr. Corridon says, will mean the transfer of the Belmont Park station to the Newark terminal. The eight or nine aeroplanes now used on Long Island will be increased to fifteen, and all will be stationed in Newark which will be the distributing in Newark which will be the distribution. in Newark, which will be the distributing point for supplies.

Mr. Corridon announced that the War Department has arranged to use the Newary station as a landing field. All aviators, whether in a private or commercial capacity, will be permitted to land at the field as long as it does not interfere with aerial mail operations.

Charles E. Bradley, Formerly of 271st Bombing Squadron in Aerial Mail Service

Charles E. Bradley, one of the newly appointed aerial mail pilots, was born at Sedan, Kansas, September 26, 1894. He graduated from Northwestern University, Chicago, Illinois, in 1916. His aeronautical ground school work was commenced in June, 1917, at the University of Illinois. He received his first instruction in flying at Wilbur Wright Field, Dayton, Ohio, in September, 1917, and later transferred to



Charles E. Bradley, former ermy eviator, now an eerial melt pilot

Ellington Field, Houston, Texas, to re-ceive advanced training in flying. After completing a course in a bombing school he was assigned to duty with the 271st Bombing Squadron at Aberdeen Proving Grounds, Maryland,

orounds, Maryland.
He remained at this field, testing and experimenting with aerial bombs and bombing devices, until discharged on November 29, 1918. He entered the Aerial Mail Service on March 30, 1919, and was assigned to the New York-Washington route, where he

has been performing excellent service. Room for Mail Clerk on Lawson Postplane

Washington, June 3.-Recent requests for bids for aeroplanes by the Air Mail tor joins for aeroplanes by the Air Mail Service resulted in eight bids, of which the lowest are from the Lawson Air Line Co., Milwankee, which has designed a plane embodying mail car equipment, and allows for the employment of a mail clerk en route. The engines will be installed by the Government and it is expected that the Liberty engine will be used.

the Liberty engine will be used.

The aeroplane is of the biplane type, with the chassis built between the two wings, with engine space provided at each side. There is sufficient space so that the

men can walk around the body, which is enclosed in glass. A rack has been de-signed in which the mail may be distributed during the flight, and a drop chute allows during the flight, and a drop chute allows for the discharge of mail bags at principal cities without stops. A model of the plane has been ordered and will be demon-strated here when completed.

French and British Air Mail Services Carry 100 Tons of Mail During April The following details regarding the working of the French aerial services have been given out by the French Bureau

of Military Aeronautics: On the semi-official Paris-Brussels line 34 trips have been accomplished, but more

34 trips have been accomplished, but more could easily have been carried out if necessary. On the Paris-Lille route, in 61 days between February 7 and April 10, 378 mail-bags weighing 78 tons were carried without accident. From April 1 to April 10 in 20 flights there was only one motor breakdown On the Paris-Bordeaux line, which is

On the Paris-Bordeaux line, which is still in an experimental stage, from March 23 to April 29 there were 23 flying days, and 60 mail-bags, totalling 11/5 tons, were transported. There were three smashes. The average time was four hours. The Paris-Strasbourg line, serving as a histon with General Headquarters and the Government, between April 7 and April 13 model 15 voyages, carrying 128 bags, dis-model 15 voyages, carrying 128 bags, dispatches and newspapers, totalling six tons.

patches and newspapers, totaling six tons. An interesting experiment in night mail carrying has recently been carried out by the R.A.F. authorities. A J.H. 10 ma-chine with two 412 H.P. Liberry engines from No. 120 squadron left Hawkims Aerodrome, near Folkestone, at 10.30 P. M. and Bying straight through without a stop reached Cologne at 1.30 A.M. The course taken covered about 300 miles, and as there was a fairly strong adverse wind the performance at an average speed of 100 m.p.h. was particularly good. This squadron, in conjunction with No. 110 squadron at Maisconelle, the transference point in France, has been responsible for the regular Folkestone-Cologne mail service, which has been flown since March 1. During the period March 1 to April 26 th During the period March 1 to April 20 the squadron has carried no less than 1,634 lags of mails. In spite of exceptionally had weather during a large portion of this period, particularly in March, there were only ten days upon which mails were not carried. The total number of mail flights made in these 47 days was 289.

AEROPLANE INSURANCE

Merchants Fire Assurance Corporation of New York

This company issues policies covering aircraft against the following risks:

- 1—FIRE AND TRANSPORTATION
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We will be glad to discuss problems concerning aeronautic insurance.

AUSTEN B. CREHORE, Manager For two years pilot Lafayette Flying Corps. Since 1910 employed by this company.

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10 Curtiss Radiators 25000 ft. 5/32 19 Strand Cable 5000 ft. 1/8 19 Strand Cable

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Cleveland Offers Many Inducements to Aircraft Industry

LEVELAND'S situation on seven trunk lines, the B. & , O., C. C. C. & St. L., Erie, N. Y. C., N. Y. & St. L., Pennsylvania, and W. & L. E., gives it a service second to none in reaching all points of the country, and on favorable rate adjustment Two of the six trolley lines operating from Cleveland augment the facilities by operating freight service. The city's situation on the lake affords via water routes overnight service between Cleveland and Detroit and Cleveland and Buffalo during the entire period of lake navigation. Regular sailings tri-weekly or better afford through service regular satings fre-weekly to electer along through service for freight traffic to Lake Superior ports. Cleveland can be reached over night from either the Atlantic seaboard or the Mississippi River, and one-half the population of the United States and Canada is within a radius of five hundred miles.

Cleveland, the industrial giant, owns or controls over twothirds of all the shipping on the Great Lakes. It is the natural meeting point for Iron Ore from the upper Lakes and coal from Ohio, West Virginia and Pennsylvania fields, thus, it is no wonder that Cleveland out-ranks all other Amerian cities in the production of steel ships, wire, wire nails, bolts, nuts, heavy machinery, vapor stoves, electric carbons, malleable castings, telescopes, printing machinery, and many other allied industries.

Cleveland has forged ahead rapidly in the manufacture of automotive products; automobiles, aeroplanes, tractors, et cetera. Aeroplanes are manufactured in Cleveland by the Glenn L. Martin Company, Motors and various kindred parts are turned out by a large number of engineering concerns on a production scale; Motor Products & Engineering Company, E. Olst Street and Curtiss Avenue; Weger Aeronanti-

cal Motor Company, 112 Hamilton Avenue; Western Machine Products Company, St. Clair and East 73d Street. Cleveland has for many years been remarkably fortunate in having an excellent supply of high-grade labor at all times, yet without experiencing any large surplus, even in times of industrial depression. This fact may be attributed to (1) the great diversity of industrial activities, and (2) the attractive

living conditions for working men.

Indicating the variety of skilled and unskilled labor available in Cleveland, here are a few of the industries in which Cleveland either leads the entire country, or takes a very high rank:

high rank:

Astronomical Instruments, Automobiles, Aeroplane Parts,
Bolts and Nuts, Carriage Hardware, Castings, Chemicals,
Drop Forgins, Dry Batteries, Electric Carbons, Hardware,
Hoisting and Conveying Machinery, Iron and Steel Products of
all kinds, Anti Goods, Machinery, Metal Stampings, Oil Paints
and Varnishes, Shipbuilding, Stoves, Wire, Wire Nails, Wire
Fence, Wire Springs, Women's Wear.

Cleveland is the fourth city in financial importance. It is the seat of the Fourth Federal Reserve Bank, which has the third largest capital among the twelve Federal Reserve Banks.

Banks. Cleveland enjoys a temperate climate and has the lowest death rate of any of the largest cities. There are 614 miles of paved streets in Cleveland, the thoroughfares being exceptionally broad and straight. Forty-two miles of boulevards and 20 parks containing a total of 2,673 acres do much toward

and 20 parks containing a total of 2,003 acres do much toward beautifying this flourishing city. Cleveland is showing a remarkable growth in new fac-tories, population, and area. The population as estimated January 1, 1919, according to the United States Census Bureau method, was 869,831.



Aerial view of Cleveland looking toward the lakes



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If YOU hold any of the above qualifications, but have not yet registered, you are invited to communicate with the Editor (Air Service Demobilization Department) AT ONCE

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NEW YORK

WHY "BELLANCA"?

HY "ANZANI" ENGINE?

IY "TWO-SEATER"?

FOR REASONS, SPECIFICATIONS AND ALL INFORMATION :-

MARYLAND PRESSED STEEL CO. (AIRCRAFT DEPT.) HARRY E. TUDOR, Sales Manager

299 MADISON AVENUE, NEW YORK CITY

(Continued from page 723)

Central News as saying with regard to

Captain Alcock's achievement: It was a magnificent and very fine feat. I am very glad Captain Alcock was able to make the flight in real fashion with-out warships and all that sort of thing.

It is very gratifying from that point in-

Congratulatory messages have been sent to Alcock and Brown by King George. General Seely, General Trenchard, and General Sykes. Major Kennedy, father of Miss Kennedy, whose marriage to Brown was postponed till after the flight, said his daughter was "very delighted, almost overwhelmed,"

Secretary Daniels, in a press interview,

"The flight across the Atlantic of Alcock and Brown in a single 'hop' not only appeals to the imagination of every one but is a tremendous demonstration of the advance of aviation since the beginning of the war and a promise of still greater development in the future. It should inspire American aviators, too, but the de-velopment of aviation in the Navy cannot o ahead if the appropriation of \$15,000,-000 fixed by the House is not increased in the naval appropriation bill."

General Menoher, Chief of the Air Ser-

orneral menoher, thet of the Air Ser-vice, United States Army, said:
"I am very glad they have succeeded.
There is only one thing that can be said on such an occasion and that is 'hurrali!" It is a great achievement when a bomber can fly across the Atlantic inside of a day and a night. It shows that Hawker had the right idea. The only trouble with his flight was that he had the element of bad luck in mechanical difficulty which forced him to bring his plane down. The ele-The ele-

n that they did not have difficulties of The flight of the Vickers-Vimy ma-

chine on top of the splendid performance of the NC-4 shows that the plan for the spanning of the Atlantic by air was feasi-ble from the start. I will cable my personal congratulations to the two British fliers."

Rear-Admiral David W. Taylor, Chief of the Bureau of Construction and Re-

pair, said: "It was a fine attempt and a splendid achievement, and deserves congratulations from all. They took a sporting chance and won."

By an interesting coincidence—inamuch as it was the fate of a small minority of British war aviators—both members of the crew of the Vickers-Vimy biplane were taken prisoners dur-ing stirring careers on the fighting front. It would be hard to say which had the worst time of it. Captain Alcock fell into the hands of the Turks and Lieut.

Brown became the prey of the Germans. Lieut. Arthur Whitten Brown, navigator of the Vickers-Viny, to whose skill and careful preparation a large measure of the trans-Atlantic flight's success is due, is an American. His birthplace was success is due, is an American. His birthplace was Glasgow, in 1886, but his father and mother were Americans, his father having gone abroad to inaugurate the manufac-ture of the Westinghouse automatic engine, now carried on by Vickers, Ltd. coming of age Lieut. Brown claimed American citizenship, still retains it, and has no intention of relinquishing al-legiance to the Stars and Stripes. He is a member of the Royal Air Force.

(Continued from bage 739) of Air Service, Washington, D, C.

Second Lieut, Samuel McCarthy will proceed

to aviation repair depot, Speedway, Indianapolis,

Second Lieut. Thomas L. Lloyd, A. S. A., will proceed to Philadelphia, Pa., for duty in connection with hospital publications, and upon completion of this duty will return to his proper station, Washington, D. C.

First Lieut. Richard E. Lloyd is announced as on duty requiring to participate regularly and frequently in aerial flights from March 21, 1918, to July 12, 1918.

Second Lirut. Russel E. Powell, is relieved from duly with the Air Service, and will report in person to the commanding officer, military hospital, Cooperatown, N. Y.

First Lieut. David R. Shearer, will proceed to ark Field, Millington, Tenn., for the purpose Park Field, of discharge.

Major Leo G. Heffernan, will proceed to Miami, Fla., take station, assume command of Chapman Field.

First Lieut. Frank M. Tierney, will proceed to the aviation repair depot, Speedway, Indianapolis,

Second Lieut. Edwin Johnson, will proceed to Davton, Ohio, and will report to the chief, En-gineering Division, for duty.

Second Lieut. Leo B. Gape, will proceed to Washington, D. C., and report to the Director of

Lient. Col. Davenport Johnson, Jr., will proceed to Chicago, Ill., on temporary duty for the purpose of conference with the department Air Service officer, Central Department; thence to Selfridge Field, Mount Clemens, Mich., take station, assume command.

Capt. Charles W. Drew, will proceed from Walter Reed Hoseital, Takoma Park, D. C., to Selfridge Field, Mount Clemens, Mich., and re-port upon arrival to like commanding officer for duty with the first pursuit group at Selfridge Field.

Capl. Byron H. Mills, will proceed to Kelly Field, San Antonio, Texas.

First Lieut, Karl DeV. Fastenau, will proceed Wilbur Wright Air Service Depot, Fairfield



Vol. 9, No. 16

JUNE 30, 1919

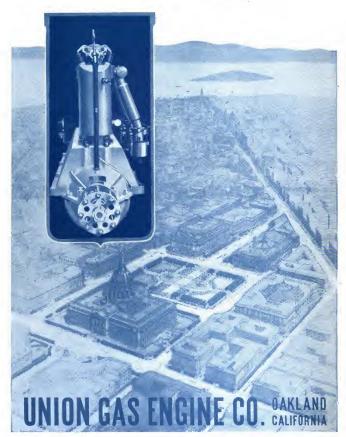
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A Bristol Monoplane Flown By Lieut. Cortinez Across the Andes From Santiago, Chile, to Mendoza, Argentina, Attaining An Altitude of Nearly 20,000 Feet

Extensive Pioneer Aeroplane Tours to be
Launched by Aerial League





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Failure of a bearing in a magneto or lighting generator destroys the earning power of the machine that carries it. To guard against this, "NORMA" Precision Bearings have been adopted as standards by the builders of this electrical equipment, having proved by service tests the security which "NORMA" gives.

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Ball, Roller, Thrust and Combination Bearines



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JUNE 30, 1919

No. 16

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VOL. IX NEW YORK, JUNE 30, 1919

EXTENSIVE PIONEER AEROPLANE TOURS TO BE ORGANIZED BY AERIAL LEAGUE

PIONEER aerophane tours, similar to the Glidden Auto-mobile Tours, which did so much to bring about the use of automobiles for pleasure and transportation, are being planned by the Aerial League of America as a means of enabling those who feel the call of the air to participate in pleasure avaition events as well as to create a market for surplus military and naval aeroplanes, and aeronautic equipment

ment,
The Aerial League, of which Rear-Admiral Robert E. Peary
is president, has canvassed part of the 30,000 ex-Army and
Navy reserve aviators, and the 34,000 Army cadets who were
under training for the Air Service when the war ended, and

has found that many are anxious to participate in such tours. These 64,000 aviators and cadets are all college men, and These 69,000 availors and cadets are all college men, and besides being directly interested in availion themselves, have parents and friends who have been anxious to make flights but could not do so because Army regulations do not permit taking civilians for flights in military aeroplanes.

From the canvass made it was found that many would like

to participate in these tours for sport and pleasure; others would like to participate as a means of continuing their aero-nautic activities and remain connected with the aeronautic movement, so as to be ready for whatever business oppor-tunities the development of aeronautics may bring; others are interested for technical and scientific reasons, and see in these tours an opportunity of obtaining actual data regarding times (our) an opportunity of contaming actual data fegalities the cost of operation of aeroplanes for sport as well as for transportation, and of determining the financial basis of a rior transportation; others are interested because it is a pioneer movement which will do much towards bringing about two of aeroplanes for general purposes and therefore should be supported.

Use of Surplus Military and Naval Aeroplanes and Equip-ment Will Bring Pioneer Aeroplane Tours Within Means of Hundreds

The use of surplus military and naval aeroplanes and aero-nautic equipment, which can be had at low cost, will bring the pioneer aeroplane tours within the means of hundreds of people interested in aeronautics for the reasons given above. The Pioneer Aeroplane Tours will create a market for surplus military and naval aeronautic equipment.

puls minitary and navai aeronautic equipment.

The Army has thousands of aeroplanes and motors, and spare parts, instruments, accessories and materials for thousands more. The Navy has over one thousand aeroplanes stored away, hundreds of which will deteriorate unless used.

and, according to Washington reports, are to be sold.

The Army has already sold over two thousand of the idle aeroplanes and close to five thousand motors, which are being put on the market at prices comparing favorably with the price of the average automobile.

Aeroplanes Can Be Rented for Tours

To assist this project, the Curtiss Aeroplane & Motor Corporation is putting into effect a plan which will enable aerial tourists to rent an aeroplane for one, two or three months. and participate in the Pioneer Aeroplane Tours at a cost of less than two thousand dollars (\$2,000) for two people, in-cluding the cost of the insurance for the aeroplane, the pilot and the passenger.

Will Establish Municipal Aviation Fields Throughout the Country

Landing places are to the aeroplane what good roads are to the automobile. To bring about the use of aeroplanes for general purposes it will be necessary to establish flying fields throughout the country, as near to the cities as possible, to facilitate air travel.

Hundreds of cities all over the United States have applied to the Aerial League of America for assistance and advice in establishing municipal flying fields, and are ready to establish them.

tablish tnem.

The Pioneer Aeroplane Tours will give the necessary incentive to bring prompt action in establishing these fields,
and whereas the aerial tours are to extend throughout the
United States and will include seaplane tours also, it is expected that in a short time there will be a sufficient number of flying fields for aeroplanes, and seaplane stations for sea-planes, to permit the employment of aircraft for transportation and general purposes.

Plans for the Aerial League of America's Pioneer Aeroplane Tours

(1) The Aerial League of America's Pioneer Aeroplane Tours, which are on the plan of the famous Glidden Auto-

ionts, which are on the pian of the famous Glidden Automobile Tours, are to start this summer and continue weekly throughout the year, extending South as cold weather comes. (2) The tours start with aeroplanes of "cononie" type, such as aeroplanes equipped with motors from 90 horse-power up, of which the Covernment has thousands for sale. (3) Every effort will be made to create a market for the surplus Army and Navy aeroplanes, motors, accessories and

aeronautic materials.

(4). When the becomes feasible, larger aeroplanes will be admitted. Then it may be well to have different classes of entrants, allowing 50 horsepower additional for every extra passenger carried. In other words, if the maximum horsepower allowed for two people is 150 horsepower, then a 200horsepower machine must carry not less than three people and a 250-horsepower machine must carry not less than four people, a 300-horsepower machine must carry not less than five people, and so on, allowing 50 horsepower for every additional passenger.

(5) Seaplane tours or cruises will be started as soon as possible. (6) To begin with, the tours will be divided into four classes, as follows:

(a) One-day tours, for people who can only spend one

day a week.
(b) Week-end tours, which will last from Friday to Sunday or Monday, for people who can only spend their weekend.

(c) "Vacation week tours," which will last one week, for people who wish to spend a week of their vacation in aerial

touring.

(d) Three-thousand-mile tours, which will last ten days, for people who wish to spend two weeks of their vacation in aeroplane touring. (7) One of the zims of the tours will be to open airways

for air travel, and establish supply stations throughout the country for air travelers.

(8) The average travel for one day in these aerial tours will be 250 miles, which is less than four hours in the air, so as to afford plenty of time each day for the aerial tourists to "take in" other diversions, such as tennis, golf, swimming, motor-

ing, riding, etc., wherever they stop.

(9) Expert mechanics, spare parts, fuel and supplies will be provided at the stopping places, where necessary repairs will be made, tanks filled and acroplanes attended to at the lowest

possible charge.

(10) Headquarters for these tours have been established in New York and at Atlantic City, at the Atlantic City Airport, which, being the civilian aeronautic center of the United States, and being ideally located geographically, will become

the starting place and terminus for the tours.

Headquarters for the tours will also be established in all

the cities selected as the stopping places,
(11) These aeroplane tours will be led by squadron commanders, who will lead the touring planes in squadron forma-

tion in all the tours.

(12) Entries can be made by individual owners, acro clubs, newspapers, States, cities, chambers of commerce, rotary clubs, colleges, automobile clubs and other organizations, and by manufacturers. The entries must be addressed to the Chairman, Aerial League of America Touring Committee, Atlantic City Airport, Atlantic City, N. J.

Tentative Routes for the Aerial League of America's Pioneer Aeroplane Tours

250 Miles Tour to Last One or Two Days

In this tour the aviators will start from Atlantic City Airport, in formation, follow the coast, land at either Sea Girt or at Asbury Park or Keyport for gasoline, continue to New York, land on the New York Police Aviation Landing Place at Seventy-ninth Street, near Columbia Yacht Club, liave lunch and fill the tanks. The New York stop may be made at Garden City and the aerial tourists may participate in sporting events being held there.

From New York follow air route over Elizabeth, New Brunswick, Princeton, Trenton; land at Philadelphia. Start from Philadelphia and either fly straight to Atlantic

City or to Wilmington, and return to Atlantic City On this route there are landing places practically everywhere, from thirty to fifty miles apart.

500 Miles Tour to Last Two or Three Days

In the control will not from Alambe City Air-port, in formation, between the coat, find at either Sea for or at Ashury Park or Keyport for gasoline, continue to New York, land on the New York Police Aysiston Landing Place at Seventy-ninth Street, near Columbia Yacht Cluli, have lunch and fill the tanks, The New York stop, may be made at Garden city and the acrial tourists may participate in sporting

Garden etty alle de arria ourses may participate in sporter veents being beld there. From New York follow air route over Elizabeh, New Prinswick, Princeton, Trenton; Jand at Philadelphia. Stop overnight at Philadelphia. Start from Philadelphia in the morning, fly to Wilmington, then to Hayre-de-Grace, then to Baltimore for lunch.

After lunch proceed to Washington (land at Bolling Field or College Park), and either stay at Washington overnight or fly back to Atlantic City by way of Annapolis and Dover.

750 Miles Tour to Last Three or Four Days

In this tour the aviators will start from Atlantic City Airport, in formation, follow the coast, land at either Sea Girt, or Asbury Park or Keyport for gasoline, continue to New York, land on the New York Police Aviation Landing Place at Seventy-ninth Street, near Columbia Yacht Club, have lunch and fill the tanks. The New York stop may be made at Garden City and the aerial tourists may participate in sporting cearusen City and the actial tourists may participate in sporting events being held there. From New York follow air route over Elizabeth, New Brunswick, Princeton, Trenton; land at Philadelphia. Stop overnight at Philadelphia. Start from Philadelphia in

the morning, fly to Wilmington, then to Havre-de-Grace, then to Baltimore for lunch.

After lunch proceed to Washington (landing at Bolling Field or at College Park).

From Washington proceed to Richmond by way of Fred-erickshing, and from there to Newport News and back by following coast line, and making a landing at Cape Charles or

1000-Mile Tour to Last From Four to Six Days

Cape May.

In this tour the aviators will start from Atlantic City Airport, in formation, follow the coast, land at either Sea Girt port, in tormation, tottow the coast, and at either Sea Offt or Asbury Park or Keyport for gasoline, continue to New York, land on the New York Police Aviation Landing Place at Seventy-ninth Street, near Columbia Yacht Club, have lunch and fill the tanks. The New York stop may be made at Garden City and the aerial tourists may participate in sporting

Carden C., John M. C., Carden C., Cumberland, Brockton, Lancaster, Hagerstown, Washington, D. C.; Baltimore, Wilmington, Middletown, Mays Landing, Atlantic City Airport.

1,500-Mile Tour to Last From Six to Ten Days

In this tour the aviators will start from Atlantic City Airport, in formation, follow the coast, land at either Sea Girt, or Asbury Park or Keyport for gasoline, continue to New York, land on the New York Police Aviation Landing Place at Seventy-muth Street, near Columbia Yacht Club, have lunch and fill the tanks. The New York stop may be made at Garden City and the acrial tourists may participate in sporting events being held there.

events being neit intere.

From New York proceed to Albany (landing on Municipal Flying Field); then proceed to Buighanton, thence to Ithaca, Rochester, Batavia, Buffalo, Brockton, Eric, Cleveland.

From Cleveland proceed to Toledo, Lima, Piqua, Dayton, Camarilla, Wheeling University

Springfield, Columbus, Zanesville, Wheeling, Cumberland, Hagerstown, Lancaster, Washington, D. C.; Baltimore, Wilmington, Atlantic City Airport.

2000-Mile Tour to Last From Eight to Ten Days

In this tour the aviators will start from Atlantic City Airport, in formation, follow the coast, land at either Sea Girt, or Asbury Park or Keyport for gasoline, continue to New York, land on the New York Police Aviation Landing Place at Seventy-ninth Street, near Columbia Yacht Club, have lunch and fill the tanks. The New York stop may be made at Garden City and the aerial tourists may participate in sporting events being held there.

events being neus inere.
From New York proceed to Albany (landing on Minicipal Flying Field); then proceed to Binghamton, thence to Ithack, Rochester, Batavia, Buffalo, Erie, Brockton, Cleveland, From Cleveland proceed to Sau, Sudusky, Toledo, Lima, Piqua, Dayton, Springfield, (Olumbus, Zanesville, Wheeling, Union-

town, Cumberland, Hagerstown, Washington From Washington proceed to Fredericksburg, Richmond, Newport News and back to Atlantic City, following the coast line, stopping at Cape Charles, New Church, Cape May, or by

2500-Mile Tour to Last From Eight to Twelve Days

other cities inland.

In this tour the aviators will start from Atlantic City, first first tour the aviators will start from Atlantic City, Girt, Gi lunch and fill the tanks. The New York stop may be made at Garden City and the aerial tourists may participate in sporting events being held there.

events being held there.

From New York proceed to Albany (landing on Municipal Plying Field); then proceed to Binghamton, thence to Ithaca, Rochester, Batavia, Buffalo, Erne, Brockton, Clerehad, Hudson. South Bend, Terre Haute, Chicago, Then return by way of Jolet, La Sale, Peoria, Springfield, Ill.; St. Louis. From St. Louis to Elingham, Terre Haute, Indianapolis.

From Indianapolis to Dayton, Columbas, Wheeling, Unicatown, Cumberland, Hagerstown, Washington, D. C.; Baltimore, Wilmington, Philadelphia, Atlantic Clur.

3000-Mile Tour to Last From Twelve to Fifteen Days

In this tour the aviators will start from Atlantic City Air-port, in formation, follow the coast, land at either Sea Girt, port, in formation, follow the coast, land at either Nea Girt, or Aslury Plark or Keyport for gasoline, continue to New and the Commission of the Commission

From New York proceed to Albany (landing on Municipal Flying Field); then proceed to Binghamton, thence to Hhaca, Rochester, Batavia, Buffalo, Erie, Brockton, Cleveland.

Rochester, Batavia, Buffalo, Eric, Brockton, Cleveland, From Cleveland proceed to Sandusky, Toledo, Detroit, Hudson, South Bend, Cliciago. From Sandusky, Toledo, Detroit, Hudson, South Bend, Cliciago. From St., Louis to Sparta, Perofa, Springfeld, Illi, St., Louis to, Sparta, Company, Ala; Americus, Ga; Macon, Ga; Augusta, Ga; Columbia, S. C.; Finelburst, M. C.; Raleigh, N. C.; Richimond, Va; Frederickshurg, Wa; Washinston, D. C.; Willmington, Del; Philadelphia, Fa; Adlantic City.
While this route is most extensive, every place mentioned on this route, from St. Louis to Temestee, Missouri, Alabama.

Georgia, North Carolina, South Carolina and Virginia, has been used as a landing place by U. S. Army aviators, and is known to have a suitable landing field.



THE NEWS OF THE WEEK



Aviators of All Nations Eligible for \$50,000 Trans-Pacific Flight

Los Angeles.—Licensed aviators of any antionality may compete in the proposed transpacific aeroplane flight for which seems of the proposed transpacific aeroplane flight for which seems of the proposed transpacific are seems of the proposed transpace and transpa

The contest will be open from next September to February, 1920. The flight must be completed within 12 days.

If the flight across the Pacific is not completed, line said, the aviator reaching the Hawaian Islands in the shortest time would receive \$10,000. If no contestant reaches the Hawaian Islands the aviator who flies the furthest in that direction will receive \$5,000.

Curtise Triplane to Attempt Altitude Flight

Roland Rohlfs, test pilot of the Curtiss Company, will make an attempt this week to bring back to America the world's altitude record in a new Curtiss triplane known as the Wasp. The present record of 33,136 feet was made recently by the French aviator Adjutant Casale.

French aviator Adjutant (Casale, ave been specially modeled for facilities) and the modeled for facilities with the modeled for facilities and the modeled for facilities with the modeled facilities as a small machine, designed as a fighting 'plane for the Army, but was not completed until the armistice was signed.

Under official Government tests with a full military load it established the world's record in speed at 163 miles an hour. It also has established the climbing record, accending 16,000 feet in ten minutes. The Washp is the smallest triplane in the world, measuring 32 feet across the wings. The length over all is 23 feet 3 inches, and despite the three wings she is but 9 feet 10½ inches high.

Cascade Mountains Crossed by Curtiss Biplane

Cle-Elum, Wash.—Lieut, Jay M. Felters, with Private Edward Kessel as passenger, crossed the Cascades from Seat-



Captain Roy N. Francis standing in front of the Martin bomber, which he will pilot scross flee continent.

tle to this place at an altitude of 9,000 feet, covering the distance of 95 miles in 70 minutes. This is the first crossing of the Cascades from Seattle.

the Cascades from Scattle. New York City Will Establish Landing Field

New York City—At the request of Major Gen. Charles T. Menoher, Chief Major Gen. Charles T. Menoher, Chief Army, New York City may construct a municipal landing field for commercial main and military aeroplanes. This developed recently at the meeting of the Board of Estimate, when Comproller Charles L. Craig liab lefore the board as the proposed field. Memoher regarding the proposed field. Memoher regarding the proposed field.

According to the communication from Ceneral Menoher, the Government has adopted a general policy to further the project. The General predicts that the development of aviation in the United States will be along both military and commercial lines. He states that the Post Office Department now finds it necessary to establish throughout the country terminal or way stations for its aerial mail deliveries, and joins with the Air Service in presenting the project to the attention of the city of New York.

of the city of New Ork.

of the city of New Cork.

munication from the Director of Air Service, should the city of New York decide to co-operate with the Government in establishing landing, fields, the army will obligate itself to design the city of the city of the city. The Army will request that the city hear the experience of the city. The army will request that the city bear the experience necessary for the establishment of the landing field, and the city of the cit

The matter was referred to the Finance and Budget Committee.

and studget Committee.

The Queens Chamber of Commerce is fighting hard for the establishment of the municipal landing field within that borough. A field located there, according to the manufacturers, would not have the same advantages as one in Central Park, owing to the extra time taken to get to

the heart of the city.

By draining the reservoir in Central
By draining the reservoir in Central
Park, they assert, the present facilities for
the public would not be interfered with.
It would have the advantage of heing free
from trees, telegraph and power lines, stall
buildings and other things that might
make landing dangerous. There would
also be ample room for the machines to
take off.

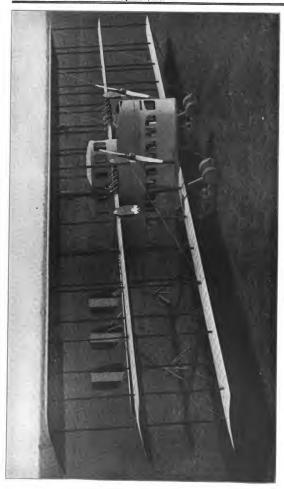
Admiral Benson Urges Naval Aircraft Development

New York, N. Y.—Returning aboard the battle-ship Arkansas, Admind William S. Benson, naval advisor to the American Commission for Negotiating Peace, and chief of operations of the Navy, experimental and the American Commission of the Save and chief of acronattics in naval warfare requires that this arm of the service he extensively developed and that continued.

"The thing that particularly interests me," said Admiral Benson, "is naval aviation. The Navy will devote much time and money to experiments in this field in the future, but there will be no daring attempts. We must rely on scientific data and the steady progress that they will give."



The Martin bomber, which will be used for the trans-continental flight. It is powered by two Liberty majors



The 30-Passenger Caproni Triplane

W INGS have a total span of 9 6' -1 0''.

Overall length 49'-2". Height 24'-6''.
Wing Chord, 9'-1' and gap between planes, 8'-9''. The wing area is 2,600 square feet. Weight, empty, about 14,000 pounds. Weight, loaded, alont 25,000 pounds.

loated, about 25,000
The re are five Isotta Fraschini V 6
Type, 6 cylinder, 260 H.P. engines; the two inner engines of the control of the con

The passengers are seated side-by-side on the upper deck. The lower deck contains, be sides accommodations for 22 passengers, a toilet room and a small car where drinks, sandwiches, etc., are served. The passenger compartment (room for 8 persons) on the upper deck, is used as

persons) on the upper deck, is used as a smoking-room. The machine is designed for five engines of 400 H.P. each, and it can beequipped with Liberty "12's" or Eagle Rolls-Royce. Pending the installation of these engines, the machine is flying with the 1's otta Fraschini engines.

Read and Towers to Be Greeted By Aero Club of America

New York, N. Y.—Arrangements for the reception of Commander John H. Towers, commander of the trans-Atlantic high goat squadron, Liestenant Commander Albert C. Read, commander of the successful NC-4, and Liestenant Commanders Little and Richardson are being completed by a committee of the Aero Club of America. Commander Towers and his committee of the Aero Club of America Commander Towers and his committee of the Aero Club of America and his commander Towers and his committee of the Aero Club of America announced. The Aero Club of America announced Towers and are due to arrive on June 26.

The Aero Club of America announced the appointment of a representative committee of officers and members to take a state of the appointment of the

As soon as arrangements can be made the Aero Club will tender a dinner to the commanders and crews of the NC-1, 3 and 4. The invitation was extended while the aviators were at Paris, and a wireless reply from Commander Read said their first duty would be to report to Secretary Daniels, and that arrangements for the dinner should be made through the Navy Department, A date will be fixed as ssoon as

Aerial Patrol Ordered for Mexican Border

Washington.—Three aeroplane units of six machines each have been ordered by Director of Air Service Menoher to leave Kelly and Ellington fields, Texas, immediately to conduct observation work along the Mexican border.

Guardian Angel Parachute Tested at Atlantic City Airport

Atlantic City.—The "Guardian Angel" parachute, officially adopted by the British and the Briti

Angel"
ne Britcertain
rd, was
Airport
A. A. F.,
land. with hei



Central News
Plymouth's welcome to the crew of the NC-4. Lieutenant-Commender Read is passing
through St. Andrew's Square

sand feet in an aeroplane piloted by Eddie Stinson. After circling for a moment both Major Loose and Miss Boyden dove head first from the machine.

A big crowd, including many aerial experts, saw the parachites open without a jerk and waiched the demonstrators float gently to the ground. The tests will be repeated Saturday. Among those who witnessed them were Glem H. Curtiss, Henry Woodhouse, of the Aerial League (Club of America: Lieutenant G. W. Shaw, U. S. N., and Albert T. Bell, president of the Atlantic City Aero Club.

Petrova Visita Atlantic City, Airport Atlantic City, N. J.—Olap Petrova, the noted Russia dramatic star and screantist, visited Atlantic City, Airport rearist, visited Atlantic City, Airport rearists, and the star of the Airport rearists, and the star of the Airport rearists, the Airport rearists, and the Airport rearists, and the Airport rearists and the Airport rearists and the Airport rearists and expressed very agily the contrast between flying in the with her first flight in an exposed machine.

A Challenge to Parachute Manufacturera Atlantic City.—A challenge to American makers of parachute aerial life pre-

cait makers of parachute aerial life preservers was issued to-day by Major T. Orde-Lees, the British parachute expert, who is at the Atlantic City airport, where he will demonstrate the British parachute known as the "Guardian Angel." The challenge is issued to prove by competition the superiority of the "Guardian Angel" parachute as a life preserver for aviators and air travelers.

Major Orde-Lees gives the selection of Monday, June 23rd, and Thursday, June 26th, for the competitions.

The challenge was telegraphed by Major Orde-Lees to Lawrence Sperry, Farmingdale, Long Island, Lieut, Jean Ors, the French parachute expert, who has been demonstrating his unique device at the Atlantic City arport; W. L. Watkins, who also displayed his chute at the local field, and the Irving Airchute Co. \$23 Main St., Buffalo, N. J. Buffalo, N. J.

The public and the aeronautic and military and naval authorities have been invited to witness the demonstrations.



THE NEW CURTISS WIND TUNNEL

THE wind tunnel has been employed by the Curtiss organization as a means of verifying aeronautical design since 1908. Two tunnels of two and four foot diameters respectively had been built and used up to 1918. The four-foot tunnel is still in active service at the Curtiss Engineering Company's plant at Garden City, L. I., and the two-foot mech-anism is used for qualitative experimentation as well as for exhibition purposes. Both, however, have been supplemented to a large extent by the new seven-foot tunnel which was planned in 1918 and completed early in 1919. This is believed to be the largest and most efficient device of its kind in the world.

In describing this new tunnel it will be In describing this new tunner it will be desirable to recall certain facts about the wind tunnel in general. The chief purpose of the apparatus is, as the aeronautical reader knows, to test out the efficiency ciency of an aeroplane or aeroplane ele-ment design before production is begun, as well as to afford a means for carrying as well as to antora a means for carrying on aeronautical rescarch. Such a test is effected by sucking a stream of air through a tunnel or tube-like structure past a small model of the contemplated aeroplane or aeroplane element, and registering, through mechanical devices, the various effects of the air in pounds of force on the model. The air rushing by the model produces the same result as if the model were passing through the air. Effects in lift, drift and conilibrium can be accurately measured and studied. Nor is it necessary to make the test at the speed in miles per hour at which it is de-passes through a honeycomb which pro-sired to fly the full-size aeroplane. Data duces a straight, uniform flow of air at obtained from a slower speed can be the point where the model is supported made the basis of prediction for any just beyond. obtained from a slower speed can be made the basis of prediction for any velocity contemplated.

A wind tunnel is in principle a single continuous tube, but this tube is divided into three sections. They are termed the collector, the experimental or test chamber, and the diffuser. The motor operates at the large end of the diffuser, sucking the air through the collector, experi-mental chamber and diffuser towards

itself. The new Curtiss tunnel is suspended on The new Curtiss tunnel is suspended on steel cables from the ceiling of a room 103 x 30 x 35 feet. The suspension device allows a perfectly free and symmetrical circulation of air back from the point at which a 400 H.P. motor with a three-bladed propeller sucks it to the horn-shaped mouth of the collector, where it is again drawn into the tunnel. This method of support, which is one of its movel feature. tures, has given excellent results.

The collector portion of the tunnel is 15 feet long. The entrance diameter is 17 feet; the diameter at the wall is 7 feet. The shape is determined mathematically. The cross section is a twenty-sided polygon. The wooden rings are constructed by placing together two ten-sided polygons and rotating one relatively to the other. This construction is exceedingly strong and rigid. The air pressure on the walls of the experimental house is about 36 pounds per square foot when the wind speed is 100 miles per hour. The air then

Models used for this purpose must be constructed with the greatest accuracy in order that the results obtained from them may be reliable when applied to the full size aeroplane. They must be made absolutely to scale; the dimensions of the wings, struts, tail surfaces, etc., being reproduced to one-thousandth of an inch.

The effect of the air current is to pro duce a lift and a drag on the model, which quantities are precisely measured by moving weights along the weight arms of the balance. The only part of the balance extending into the wind stream is a rod or spindle on which the model is mounted. The correction for the effect on wind flow on this spindle is easily made.

The model, sometimes as large as three feet in span, is attached to a steel vertical arm or spindle which holds it at the cen-ter of the air stream. It is at the forward end of the experimental chamber. The chamber has a length of fifteen feet and a champer has a length of niteen feet and a width of thirteen. It is thus of much greater diameter than the rear end of the collector, or of the diffuser, which, start-ing at the front end with a diameter of eight feet, gradually enlarges until at the motor end it is twelve feet in diameter. The diffuser is thirty-seven feet long.

The four-foot tunnel is of another type -the enclosed type-in which the experi-mental chamber is of the same diameter mental chamner is of the same quameter as the diffuser and the small end of the collector. This, in the opinion of those who constructed the Garden City wind tunnel, has several disadvantages.

For instance, it restricts narrowly the size of the model. Every model causes some displacement of air. Displacement tends to cause an expansion of the crosssection of the air stream. With very small shapes the bad effects are negligible, but as the model grows larger it creates sufficient displacement to cause air-packing against the tunnel sides, and consequently a type of flow different from that actually obtaining in free air. In the Eiffel type of tunnel displacement can occur without this interference with the occur without this interference with the air stream. The air column keeps rather closely the form in which it leaves the collector. The diameter of its cross-section is thus approximately seven feet. Passing through a chamber whose cross-section has a diameter of thirteen feet, it

has room for expansion.

Another disadvantage of the enclosed Another disadvantage of the enclosed type may be noted. The air stream completely fills the tunnel. The manipulator is thus forced to stand outside. As a consequence, adjustment of the model is made so difficult that in order to effect it made so difficult that in order to effect it the motor operating the tunnel is usually shut off. In the Eiffel type, however, the manipulator stands inside the tunnel in the experimental chamber. From his place just outside the air column he can reach out and adjust the model at will.

The experimental chamber extends above and below the tunnel itself, and rests on the floor instead of being suspended by wires. It is composed of three stories. The first is below the tunnel, and contains the base of the pedestal or balance, by which the forces exerted on the model are measured. The aerodynamic balance is mounted on a concrete pedestal and the vertical arm of the balance extends thru an opening in the floor to support the model in the air stream above. A dash pot damps out the oscillations of the bal-



The collector or intake nozzle and a part of the experimental chamber of the seven-foot Curtiss Wind Tunnel. The mouth is 17 feet in diameter.



The first story of the experimental chamber in the seven-foot Curtiss Wind Tunnel, showing the uni-pivotal measuring balance, the spindle of which, projecting upward into the stream of air above, supports the model.

nece. By means of this sensitive instrument the air forcet in any direction on the models are accurately measured. The rotating forces or moments on the models are also measured. The second story comprises the tunnel, into which the model projects. Air to the middle compartment of a metal honeyomb screen which serves to straighten out the air stream flowing in thru the collector just before it flows by the model. The air stream passes across in diameter as adjusable speck controlled by the operator stationed below at the balance. The chamber is lighted electrically, and provision is made for power outers. Direct, alternating and threetesting, pump testing and other experimental purposes. It also has a switch for electrical control of the motor, a Krell gauge to indicate the existing und speeds.

The balance used is a specially designed uni-pivot type which measures forces to less than .0001 of a pound. Air speeds up to 100 M.P.H. are now obtainable and it is expected to exceed this shortly.

The two Currist wind tunned is the result of a long period of study of wind tunnel types. Data was collected on the Massachusetts Institute of Technology Washington Navy Yard, Eiffel and other European tunnels, and an effort was made to the control of the control space, and every effort was made to get a clean and uniform return of air from diffuser to collector ends. The ideal wind tunnel would stand in free air except that free air is seldom calm. The best subsidiary of the collection of the

is expected that the results will be valuable as indicating the type and degree of variations which must be expected.

The purpose of the wind tunnel being to check up on designs, it is interesting to know that there has been no recorded in-stance of a wind tunnel test made in one of these tunnels failing to tally with the later performance of a full-size machine.

No Curtiss model tested in miniature

NO CUTTISS model tested in miniature and pronounced satisfactory has failed to fly according to promise. The wind tunied tests have been 100 per cent, reliable, cating as it does that the aeroplane is on a thoroughly scientific basis even before the first lumber has been milled for it or the first fittings cast.

Such results are of inestimable benefit to the designers, and to the pilots who thoroughly test out the full-size machine before production and sale.



The seven-foot Curtiss Wind Tunnel, looking forward, the diffuser in the foreground, and the rim of the collector visible behind the experimental chamber to the rear.



THE WHITTEMORE-HAMM MODEL-L BIPLANES

THE Whittemore-Hamm Type "L" Aeroplanes are tractor biplanes. They are all of the same dimensions, but with different engines as follows: The L-2 has a 90 H.P. engine; L-3, 100 H.P. engine; L-4, 125 H.P. engine; and L-5, 150 H.P. engine.

The engines used are Curtiss, Hall-Scott and Hispano-

Suiza.

The following specifications for the L-2 apply to the other machines in so far as dimensions are concerned.

General Specifications

Span, upper plane	
Span, lower plane 30' 4"	
Chord, both planes 5' 6"	
Gap, average	
Length overall	
Incidence angle	
Engine, Curtiss or Hall-Scott	
Endurance	
Gross load	
Useful load 600 pounds	

Wing construction is conventional, but all hinged surfaces wing construction is conventional, out all finged surfaces are fastened by fittings which make a tight connection, leaving no gap which generally exists in biplanes. There is no center section. The upper wings are connected to a pair of "A" struts over the cockpit.

struts over the cockpit. The isologie has five ash longerons running from nose to back of rear cockpit. These longerons run into a three-ply engagement of the comparison of t deep cockpit, and at the same time permitting a reduction in head resistance.

The rear or laminated part of the fuselage has no wires in compression members, thereby doing away with all care for

Flaring ailerons are used on upper planes only. Operating cables from under side of top plane enter side of body at points below rear cabane struts. Dual Deperdussin wheel-control is installed.

In the interplane bracing system, both flying and landing cables are double. The overhang on upper plane is supported by streamlined steel tube braces.

by streamlined steel tube braces. The landing gear is a departure from the practice generally employed. There are six struts in all; forward struts attached to the body at lower side longerons; middle and rear struts, which are of inverted V formation, attach at the lower of "Reef" longeron. Landing forces are thus transmitted to the body with advantageous distribution. The usual rubber shockaborther dashed: is used covered with a streamline aluminum

absorber General Absorber General Constitution of the Management of the State of th

Piloted by Melvin W. Hodgdon, the L-2 made the flight from Boston to Atlantic City in 3 hours and 29 minutes actual flying time. Full time consumed in the flight was 5 hours and 15 minutes, which included a stop of 1 hour and 16 minutes at Central Park, L. I., where extra fuel was taken aboard for the continuation of the flight.

The L-2 was designed by Dr. Whittemore and his partner, Mr. Hamm. Both these men became interested in aviation as a result of the Harvard-Boston Aviation Meet at Squantum, Mass., in 1910-1911.

Hodgdon has been flying for about six years with the Whittemore-Hamm Company. During the war he was a pilot and instructor at one of the Government flying schools in the South.



A 100 H.P. Model L-2 Whittenore-Hamm Biplane used by Theodore E. Hedlund, Aviation Editor of the Boston Post



400 H.P. aeroplane engine dynamometer with engine bese supports

of aeronautical engines and apparatus and apparatus and are recognized as standard laboratory equipment for the testing of entesting of en
testing of en
testing

ing rotor of the dynamometer, which transmits the full torque exerted by the engine to the external field or oscillating frame by electromagnetic interaction. The oscillating field frame is balanced on ball-bearing pedestals and is restrained from revolving by the scales on which the torque is measured. Horzepower is the product of torque and speed. Specifi-

cally for a dynamometer,

R.P.M. × lbs. pull × torque arm in feet

By making the torque arm, or distance between the point of application of the scales and the center of the shaft, a certain length, the horsepower formula is simplified.

For the dynamometers described in this article the formulas

pounds pull on scales × R.P.M.

H.P. =

with some scale arrangements, and with others:

pounds pull on scales × R.P.M.

These simple formulas can be worked out or a straight-line power-chart used.

The electric dynamometer requires a source of separate excitation for the fields at either 115 or 280 volts direct current. In special cases the dynamometer may be made self-exciting, but its speed range under these conditions is limited, and, expower required for excitation of the fields is extremely small. A larger source of supply however, is required where the

power required for excitation of the fields is extremely small.

A larger source of supply however, is required where the dynamometer is used as a motor.

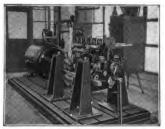
Dynamometers are built in sizes ranging from 1 H.P. to 1,000 H.P. The sizes most used range from 50 H.P. suitable for engines having a maximum torque of 50 to 200 foot



U. S. Liberty 12-cylinder aircreft engine in test with Sprague

pounds up to 400 H.P. machines for engines with a torque capacity of 800 to 1,600 foot pounds. In testing very large capacities two or more dynamometers can be coupled in tandem.

The maximum speeds range from 4,000 R.P.M. on the 50 H.P. machine to 2,500 R.P.M. on the 400 H.P. machine. The Sprague dynamometer may be run as a transmission dynamometer for starting the engines in test, and also for



A Hall-Scott engine being tasted an a 200 H.P. dynamometer at the Dayton Engineering Laboratories

measuring the friction horsepower and so determining the mechanical efficiency. For such operation the requirement is an adequate supply of direct current at either 115 or 220 volts. For friction horsepower tests the supply of direct current available should be at least 25 per cent of the maximum

capacity of the engine to be tested.

Dynamometers for laboratory installations, fitted with the automatic control and a wide range rheosat capacity, are capable of variation in load and speed through a range as great as can be carried by any engine within the maximum capacity of the dynamometer. Diperated as a generator or brake, the speed can be controlled from practically a standstill up to a maximum of 2.500 to 4500 R/M, depending upon the particular dynamometer in use, through a very great range of sixed speed can be controlled. If backed up with direct current power of sufficient capacity the speed range as a motor or transmission dynamometer is nearly as great is nearly as great.

Throughout the speed range the dynamometer can be made to resist to its full rated torque capacity, where required. In practical service the equipment is laid out for full torque capacity through an intermediate range, but by speedal provitained from zero to maximum speed, with short time overload torque capacity up to the limit of the dynamometer.

As a result of this great flexibility of control, it is possible to study the performance of engines beyond their ordinary limits of load and speed, and it is possible on one dynamometer to conduct tests on a wide variety of engines, both large and small and both high speed and low speed.

THE PHYSIOLOGY OF FLYING

By W. GUY RUGGLES

tor and Inventor of the Ruggles Orientate

HE most complex handiwork of the Creator is man. Groping mentally upward in the dawn, he early learned to articulate something that meant "why and enlightenment has steadily followed. and enigntement has steadily browen.

By force of will and mind power he has prevailed over the entire animal kingdom, constantly adding to his mental development and physical comfort through the centuries.

Essentially a land animal, the seas tempted him and he devised means for navigating that unnatural element. Comparatively slow of travel

ment, he has, ever since that fateful mo-ment in which he conceived his first thrill of speed-perhaps on some icy slope-compelled the swifter animals, and still swifter inanimate elements of nature, to provide him with an ever-increasingly rapid means of locomotion, until with a genius and courage that almost defies practical imagination he launched himself off the earth and water and at still greater velocities is realizing another step in his progress by conquest of the air.

In all the history of the human race there is no more romantic narrative than the story of man's attempts to master the many problems involved in flying through the atmosphere, and those of us who have been interested in the dream of flight since childhood will never forget the elation we felt when the announcement was

tion we ten when the announcement was made, "The Wright Brothers Are Flying," The progress made in the art since that momentous event is almost beyond com-prehension. By directing according to his will the elements he exceeded in swiftness and strength all the creatures of the earth and sea, and he has already excelled in fleetness and power all the bird creations

Deep indeed is the reverence we feel for the genius that made man's dream of flight into a splendid accomplishment. The man of the world has caught the spirit of the future more than we realize. Men are going to fly: the active business man to keep vital engagements-as for instance in New York, Boston and Philadelphia or Washington the same day; deliveries by air mail; others will fly entirely for recreation in order to effect the widest possible change from the business routine, possible change from the business rotune, and long for an hour in the clean, wide spaces of the blue sky with its expanded horizon outlook on life, and a plunge through the fleecy clouds. Be the costs or the risks what they may, the present and future generations will not be denied these opportunities.

We cannot, however, and should not if we could, forget the disasters that have cost the lives of many brave and some very skillful men while advancing the science of aviation.

About ninety per cent of the fatal stu-dent-aviator accidents are due, a United dent-aviator accidents are due, a United States Army officer has stated, to mis-takes or shortcomings of the man in the plane. Why does lie make those mis-takes; what are they? Unfortunately the man that survives a crash usually seems hazy about how it happened.

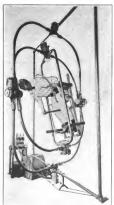
As a child, the writer had the good fortune to associate with surgeous and physicians and become interested in some of the problems and mysteries of animal life. the problems and mysteries of animal file. Later when the rare privilege came of meeting and studying the performances of such men as Ely, Parmalce, Latham, Radley, Beechy, and many others, and I

made an effort to analyze the cause of the regrettable accidents that deprived the art some of the bravest men that ever lived, extensive study and experimentation beyond the scope of this paper resulted in the firm conviction that piloting a plane involved a problem in physiology differing essentially f from the customary activities

To the accomplished aviator piloting a good plane at moderate altitude is about



Ruggles Orientator-Model



Ruggles Orientator-Model 2

as simple as walking on the earth. Between his first flight and that degree of perfection some very perplexing and unusual problems have been mastered by the student-aviator. Discovery of the reason for some of these things seems to be quite recent. Valuable information on the sub-ject is also to be found in the records of research work done by scientists a hun-

research work done by scientification and dred years ago technical terms, walking, running over uneven surfaces, riding a bicycle, or similar activities may be combined to the surface of the surface of the surface of the surface of the organism by which is the hain receives and verifies by which the brain receives and verifies by comparison, the information it receives comparison, the information it receives from the sensory organs, and endeavors to make corrections for errors as the muscles go into action, unfolds to the student as one goes more deeply into the

subject Man has been popularly accredited with five senses: sight, hearing, smell, touch and taste. These sensory organs send to the brain information that falls within their limitations. When a subject may be sensed by more than one of these senses the brain, it appears, verifies the report of one sensory organ by "checking" it to the report coming from a different organ that perhaps sends information of an entirely different character, but most useful for a comprehensive understanding of the subject. Naturally the more reports that can be received the more thorough and complete the knowledge.

Loss of one or more of these sensory organs impairs this wonderful faculty and limits its scope. For illustration, loss of limits its scope. For illustration, loss of hearing eliminates the enjoyment of music, but the same individual enjoys fruit in all its beauty of coloring, contour, fragrance and flavor. The loss of sight limits one's enjoyment of fruit to condour, fragrance and taste, but the loss of sight in no way impairs one's enjoyment of music.

A little thought will convince us how wonderfully these senses combine in our daily activities and mention is made of them here because of the very important part some of them play in flying.

In addition to these commonly ac-

credited senses man also possesses another credited senses man also possesses anomatomost important faculty—that of orienta-tion and equilibration. Sight and touch— including the muscle joint sense of body position—play important parts under varying circumstances, but the especial sensory organ of this faculty is the semicircular canal system of the inner ear with its ampaula, otoliths, and nerve ends, collectively called the static labyrinth to differentiate it from the aural labyrinth with which it is most closely connected.

Briefly, this organ consists of a mem-braneous sack out of which extend three membraneous canals lined with delicate nerve ends. These canals project around in a semi-circular shape and at the end are bulged out into an enlargement, something like the bulb of a thermometer, called the ampaula, which also contains a mass of nerve ends in the midst of which lies an otolish of limestone substance.

Just beyond the ampaula the canals narrow and are again joined to the sack at a distance from their beginning, permitting them to describe some two-thirds of a circle in size, about that of the end of a leadpencil. They are so projected that they lie in the three dimensions of space, i. e., each at right angles to the others, and the lymph that fills the sack also flows

through and fills the canals.

From the ampaula end of the canals trunk nerves are bundled together to lead to the brain, and the entire organ as a unit is surrounded by the bony labyrinth to which it is attached at intervals to hold it in position, and protected in all its wonderful delicacy by the lymph that fills the intervening spaces of the bony labyrinth in which the membraneous labyrinth floats.

This organ is a part of the inner ear of birds and other animals, one being in each side of the head directly opposite the other in its relative position, and so placed that when the animal is in a natural position two canals lie in the horizontal plane sensitive to rotation about a vertical axis, and two stand in a vertical plane sensing rotation about a horizontal axis, and two are in the lateral plane sensing rotation about an axis at right angles to either of the others. Rotation of this organ causes a movement of the lymph in the canals which is sensed by the delicate nerve ends lining the canal and transmitted to the brain. Compound rotational movements are sensed by the various canals as they come into the plane of rotation, no movement being too intricate to escape detec-tion. The nerve-ends of the ampaula sense the pressure of the otolith lying in their midst as it is acted upon by the pull of gravity or by the inertia of changing velocity, or the difference between centrifugal force and the pull of gravity which indicates the correct banking angle

while making a turn.

So important to life is this sense that scientists tell us it is present, in modified forms, in organisms that are not supplied torms, in organisms that are not supplied with the other senses. It is of such importance to animals that it is protected by the densest bony covering in the body and operates largely through the involuntary We are conscious of its activities by manifestations upon the bodily

organism.

It is this little organ that enables us to It is this little organ that enables us to stand upright on uneven surfaces in the dark and to decide quickly which of sev-eral uneven lines stand vertical. The deaf mute—born without this organ—ap-pears to compensate for its absence by exercise of the sense of sight and touch and muscle-joint sense. However, he is utterly lost under some circumstances in which the man with a normal labyrinth is entirely at ease.

In their search for enlightenment on this subject many noted scientists have done an enormous amount of the most painstaking and delicate surgery, upon birds and animals as well as upon men

who had suffered injury.

One surgeon found that the removal of the semicircular canals from a dog very seriously interfered with his muscular coordination. In time he appeared to compensate for the loss through the exercise of the other senses and could walk about quite well. He would always fall sprawling, however, if jumping from a height, exercise the sense of touch the brain was unable to determine his position with sufficient exactness to adjust his limbs to land in a position of equilibrium.

Many of us have seen a cat while fall-

ing turn completely over and alight upon its four feet. At Johns Hopkins University Doctor Muller and Doctor Weed performed a series of most exacting experiments upon cats. It was found that all cats tried would, if held up by the feet and dropped, turn over while falling and alight upon a cushion squarely upon all four feet. It was further found that if blinded by a bood over the head the turning reflex occured with almost the same accuracy, turning to either side, seemingly to be dependent upon the initial position of release. However, the removal of one internal ear destroyed the turning reflex in a majority of the cats while hooded, and those that turned appeared to turn always in the same way, regardless of the initial position of release. If both the semicircular canal systems were removed none of the hooded cats made any attempt









Ruggles Orientator-Model 3

to turn while falling, but without the hood would turn properly and alight upon their feet

Quoting from their report, "From these observations a few conclusions may be drawn. The rotation of cats on falling seems to depend upon excitations derived either from the eyes or from the semi-circular cauals. Loss of either of these organs of spatial relationship does not interfere with the falling reflex, but deprivation of both these sensory fields abolishes the reflex.

Hence, it may be assumed that the falling reflex is probably an acquired form of ing renex is protony an acquired form of protective mechanism, dependent on the influence from the semicircular canals and from the eyes, mediated largely, if not entirely through the cerbral cortex." Ewald and also Howell reported very

careful experimental work upon pigeons It was found that after the removal of one of the six canals the bird would reone of the six canals the bird would re-cover in ten days. And from the removal of two canals would recover in one month, as to walking. The bird was reluctant to fly, however. After all canals were cut away co-ordination was never perfectly recovered and the power of flight was lost. If the pigeon was thrown into the air it dashed wildly about until it crashed unon the early upon the earth.

Otologists find that man who has by accident or disease lost one or both semicircular canal systems suffer great de-rangement of the nervous system and loss muscular co-ordination.

For a time thereafter any creature so afflicted is a most pitiable object, sprawling helplessly and moving with irregular, misdirected movements, suffering terrible misdirected movements, sunering terring vertigo. Eventually the brain does adjust itself to function without that source of information, but under some circumstances is utterly at a loss, particularly when the senses of touch and sight do not apply or are misleading.

For illustration, a normal man boards

a train and notices through the window another train waiting on an adjoining another train waiting on an aujoining track. Standing, he becomes absorbed in his paper, and presently three subcon-scious actions take place so quickly he may only analyze them afterward. Through the sense of vision his brain learns that his train is apparently starting, and, in response to long habit, he leans his body forward to preserve equilibrium as the train accelerates. Immediately the labyrinth warns the involuntary brain that the body is beginning to fall, and a foot is shifted to restore the equilibrium, Meanwhile, the voluntary mind, with reasoning power, becomes aroused, and the eyes, searching for additional informa-tion, find a stationary pillar which does not change its relative position, but the other train is seen to move past the post in the direction opposite that which his vision sense had asserted his own train was starting.

On such occasions, or when walking over uneven surfaces in the dark, a man without the labyrinth will lunge awk-wardly or fall, owing to the insufficient knowledge of spatial relationship the brain is able to secure.

These extensive details are enumerated as some of the reasons why the writer was certain a super-development of the labyrinthian sense was most essential to the aviator, for, in the mobile air, his sense of touch with the ship is not entirely reliable, and his vision may be restricted, and from the moment the "ship takes the air" only his brains' ability to (Continued on page 787)

SOME CONSIDERATIONS ON THE DESIGN OF LARGE AEROPLANES

By LESLIE V. SPENCER

NEVER in the history of aviation has the large weight-carrying aero-plane with long-distance flight possibilities bent atken more seriously by the general public and the engineering world than at the present time. The transfer of the serious of the serious that the previously been awakened by the many marvelous things that have been done with the big planes during the war. No doubt the expeditions of the heavily-their previously the serious of the serious through the serious distance that the serious distance with the serious distan

across the Atlantic was most foolhardy. Yet with all the public and technical interest that has been engendered by the interest that has been engendered by the fight prize offer, and with the attention that other accomplishments of large aeroplanes have gained, it is a rather striking fact that, although some redesign of the redesign of the control of the control of the redesign of the control of the redesign o

It does not seem to the writer that in most instances enough thought has been given to the engineering side of the mattal teast possess the germ of long-distance flight ability the navigators and the manufacturers back of them have been content, have been more or less successful, rather than to strike out along new lines of thought in an endeavor to produce ships primarily intended for the kind of service

All this is by way of saying that we need more original thought in aeroplane designing. We are not at the stage in heavier-than-air machine development where we can afford to accept present even to work and do some thinking and develop new ideas—discover how to make planes better suited for the special service for which each is intended. Almost any plane will fly if it is given enough power, palme will fly if it is given enough power, etting the machines to take the air, it is time to start out and develop them for each kind of service. The heavy, weight carrying freight and passenger ship of long-distance ability must not be merely a larger prototype of it in smaller brother, a larger prototype of it in smaller brother, itself in the aerial circus. a name that it is the vitter's firm belief that the commercial future of aviation does not less om under with the small machine of the

It is the writer's firm belief that the commercial future of aviation does not lie so much with the small machine of the one- or two-passenger type as with the very large plane capable of real transportation service for the world. When man wishes to cross the ocean he does



O Int. Film Service

One solution of the problem of fuel carrying. The Short Brothers' plane, which made en attempt at the trans-Atlantic flight, carried e 650-gailon fuel tank under the fusal-a-

not get into a small motor boat and navigate the grim waters himself. Instead, he boards a great liner, where he can have

comfort and safety en route.

Therefore, let us concentrate more on
the large weight-carrying machines which
will operate over fixed routes, just as our
ships and trains do. Let us leave the
small planes for the sportsmen, explorers,
the air police and the fighters.

Perhaps no feature in the design of

Perhaps no feature in the design of large aeroplanes for long-distance flight gives the engineer more concern than the point where the weight of the fuel overcomes the advantage of a large supply, it is, of course, desirable to carry as great a quantity as possible. For the trans-talantic flight, several schemes of James Atlantic flight, several schemes of James and the amount of fuel carried ranges anywhere from 300 gallons up. The Martinsyde machine, for instance, was provided with 300 gallons. The plane has a total weight of the plane of the

to 2,000 gallons of fuel. These figures serve to indicate the enormous problem which the fuel raises in the design of long-distance machines.

It primarily resolves itself into a question as to where and how to place the tanks so as to take as little of the body to the properties of the properties of the consumption of the fuel will not unlastance the ship. It being desirable to concentrate this weight as near as possible to the center of gravity of the machine. Interesting schemes for carrying the fuel have been worked out. The NC seaplanes have their gasoline tanks disposed

Interesting schemes for carrying the fuel have been worked out. The NC seaplanes have their gasoline tanks disposed around the inside of the body, which means that the fuel must be consumed in such a way that balance will always be maintained. This involves some complication

a. On the Short Brothers' trans-Atlantic entry, an unusual tank location was decided upon. Instead of incorporating the reservoirs in the flusclage in some manner, the builders simply suspended a huge reservoir of the flusclage in some manner, the builders simply suspended a huge and the suspension of the suspension

in the writer's opinion is the added parasite resistance which it offers. Instead of making it in streamline form so as to remaking it in streamline form so as to return the streamline of the streamline of the ly did not take the trouble. Even if proerly streamlined, the location was certainly to be questioned from the resistance standpoint.

standpoint.

Although not reducing the resistance any, the suggested tank arrangement in Fig. 2 would seem to have great possibilities for trans-Atlantic flight. Suppose we support one tank of about 200 gallons



2 fwelage



Three suggested means of carrying a large supply of fuel for long flights

of 5,000 pounds, and figuring 6 pounds to the gailon, the fuel weight of 2,160 pounds is over 40 per cent of the total. With the Sopwith, the total weight was 6,100 pounds. As his plane carried only 300 pounds, As his plane carried only 300 about 30 per cent of the total. The Navy's NC seaplaness weigh complete about 30,000 pounds, so that, based on the same proportions, they carry anywhere from 1,500 under the fuselage, then under each wing hang two or more smaller gasoline drums, after the manner in which bombs are supported in the bombing type of plane. The same type of releasing devices could be employed, and after each tank and given entire the supported in the bombing type of plane. The same type of releasing devices could be employed, and after each tank adjiven entire the support of the plane. The same type of the plane is the plane to the plane

operated so that a tank under each wing would be drained at the same time, allowing both to be released simultaneously, and thereby preserving the balance. This would not be essential, however, as the difference in weight would not be sufficient to have any appreciable effect. idea would, of course, be to use the fuel in the larger tank under the fuselage last As a modification of this scheme, Fig. 3 shows how the main tank could be placed inside the fusclage so as to keep the para-site resistance down. Thus, after the wing tanks were dropped, the plane would have no outside encumbrances so far as nave no outside encompanies so tar as the gasoline supply is concerned. Still another admirable way of carrying a large supply of fuel would be to have the tanks conform to the bottom shape of the fuselage for a portion of the way back from the engine. This would have the effect of streamlining the tanks into the fuselage assembly, and at the same time an enor-mous tank capacity would be provided in one reservoir. The plan would not, how-ever, appear to have the advantages of the wing tank scheme, whereby the extra tank weight could be disposed of as soon as it had accomplished its purpose,

Retractable Chassis

While on the subject of parasite resistance, it seems periment to bring out the fact that not enough attention has been given to the fields of retractable chassis, eigent to the fields of retractable chassis, and the properties of the properties

Wheels

Aside from the small added weight of larger landing wheels, there would be distinct advantages to be gained by material

the wheel was larger and where it did not drop into the rough places so far. Every one knows that the motor car with large wheels rides over rough ground easier than the machine with the small wheels, and it is for exactly the same reasons that attention should be given to this wheel matter for acroplanes. We may be used to the same that the point of the air stream during protracted flight, it would be just as easy to make chines. Due to the weight, the wheels sink a considerable distance into soft ground, thus picking up more mid than do the tires of lighter planes. The guards are an effective means of scraping this off, if they are properly fitted and so arranged as to catch the mid as it comes around. The mid shields thus play a very important part of the tower wings, which otherwise would be hadd's spatierted and coated wise would be hadd's spatierted and coated

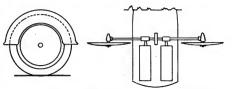


Figure 4-Fenders over the tires are desirable for heavy machines

Figure 5-The J. V. Martin scheme for enclosing the engines in the fuselage

room for large diameter wheels as those of the present day small wheels.
Also, by using larger wheels, the chassis strus would not have to be so long as at present to bring the fuselage off the ground the same height as at present. This would result in the strengthening of the landing geen as a whole, since the strength. They would also be lighter, so that when all is said and done, a chassis with large wheels and shorter strate would very likely weight no more than the

that when all is said and door, a chassis with large wheels and shorter strais with large wheels and shorter strais present type of landing assembly. It might be mentioned that the wheels should be located directly below the points of greatest weight. Where the engines are located at either side of the central poly or liveslene, it is desirable to have cach engine position and two supporting caches the strain of the strain of the strain of excessive strains ander landing shocks that the strain of excessive strains under landing shocks planes with very long wing span, it might even the desirable to have additional wheels still further out for the same rea-

with the wet substance. This causes great damage to the covering of the under side of the wings. In a number of instances where mudguards have not been used, the under wing covering has been punctured by the small stones and dirt, to say nothing of the damage done by the spattering water.

A very efficient type of guard can be designed of somewhat the shape shown in Fig. 4, and should be made preferably of aluminum, either cast or formed out of sheet stock. The metal should be of a thickness sufficient to make a rigid construction free from shaking or wobbling.

Powerplants and Their Location

As regards the methods of powering the present day large aeroplanes, it seems that in the main designers have played the game of following the leader. I do not know who it was that first hit upon the wings on either side of the main body portion or nacelle, but it appears that marry every designer has followed suit. This may or may not be the best way to position the various power units. Certain the standpoint of resistance. Buildings strong superstitutures to carry these power units in the wings is a severe structural problem, to say nothing of the great parasite: resistance of the multitude of makes necessary.

There is a great deal to be said in favor of the practice of some designers who have concentrated the power units within the main central part of the plane. The cruiser designed by Capt, James V. Maractres it to two engines aske by side enclosed within the forward part of the fuselage. A cross shaft back of them leads out on either side to the propeller, a reduction genting for each screw being provided in a small housing at the transparent of the propeller of the mechanism proper, A clutch system within the fuselage makes it possible to drive either or both propeller from one engine or from both engines. Thus it would appear that Capt. Martin

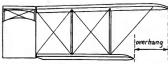


Figure 8—Overbang is not regarded as possessing sufficient edventage to offset the greater structural difficulties incident to its adoption

increase in their diameter, especially where the retractable wheel idea was inbuilt into the plane. Wheels of larger diameter would not only be stronger, but shey would have the important advantage of easier riding over the inevitable rough ground of the average flying field. Each little rut would not transfer as large a shock to the machine as a whole where

sons. Of course, many of the well-designed large machines have such wheel arrangements, but there are many instances where this important feature has been exprooked.

Mudguarda

Mudguards that come down snugly over the wheels are desirable for large ma-

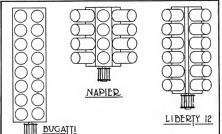


Figure 6—Some of the possible ramifications of present types of power plants
16 cylinders; 2 crankshafts.
2 banks of parallel cylinders; 1 crankshaft.
3 banks of four 45 between
cylinders
2 banks of six cylinders

has all the advantages of the designs where the engines are mounted out in the wings, and at the same time he cuts down the outlying structural work and the resistance materially. The scheme of this ship's driving mechanism is shown diagrammatically in Fig. 5.

In order to centralise the powerplant within the main fueslage, other means are possible besides ranging the several engines side by side. It would not be very types of faxed cylinder engines by having a common cranshaft for two otherwise distinct powerplants. One set of cylinders would be justed to the control of the c

nute more than the space necessary for a well-regular engine. As a well-regular engine. As a well-regular engine in the space of regine shown in Fig. 6 could be similarly doubled up to form a thirty-two cylinder unit, as shown in Fig. 7, or the Napier type, in which three banks of four visible to the space of the sp

one central shaft.

By thus concentrating the power, it could be utilized either by running shafting out to the several propellers, or the series could be placed on either end of

the engine shaft with suitable gearing interposed to bring down the rotative speed to efficient values. That is, the concern propeller on the front end of its shaft and a pusher to the rear. Clutches could be interposed to cut out either propeller a single propeller constructed by methods not at all unusual can be designed to absorb over 3,000 horsepower when geared down to somewhat under 1,000 revoludown to somewhat under 1,000 revoludown to somewhat under 1,000 revoludated to the control of the control to the control of the control of the conposition of the control of the consuggested would open up the possibility of using one or two large diameter twoblade screws instead of a number of the present types of planes. Whether or not there would be any advantage to this is an open question, although by emtisement and present proposition in the seems that greater propolities efficiency

would be probable from the aerodynamic standpoint.

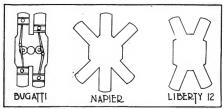
standing-uncentration of the power into one doubled-up engine as above outlined is, however, open to the criticism that should anything so wrong the entire unit is out of commission, whereas if several independent units are feet upon the rest. At the same time, the same thing may be said of any glane having only one power-plant. Besides, by having all the power at one point where it is accretised at all slight operative faults, whereas there is no chance of doing anything to a balky unit that is placed out of reach out in the wings. From this angle it seems rather cannot be reached at all when the plane is in the air.

Overhoos

The practice of extending the upper wing of a higher combination out so that it overhangs the lower wing seems to be losing ground (Fig. 8). It should for aerodynamic investigations have indicated that there is not enough advantage to be gained aerodynamically to warrant the added structural difficulties what the two did with the building of the two wings of the same length. Obviously, a stronger construction can be had where both upper and lower wing tips are in the same vertical plane, eliminating also any wire bracing plane, eliminating also any wire bracing that is almost necessary where the upper wing a bracing that is almost necessary where the upper wing is given any appreciable overhang.

Conclusions

In these pioneer days of large aeroplane engineering there is utmost need of free thinking and originality of design. We have not come anywhere near the stage yet where we can accent anything, and the stage of the



The next steps for the Bugatti, Napier and Liberty types

Combining 2 engines on a 24 cylinders by combining 24 cylinders or 32 cylinders obtain 32 cylinders engine engine combining two 12 or cylinder engine



The AIRCRAFT TRADE REVIEW



American Handley Page Company Incorporated in New York State Ogdensburg, N. Y.—A certificate of in-corporation for the American Handley Page Company has been granted at the State capital. The company is organized State capital. The company is organized United States to carry passengers and merchandise.

The new company is capitalized at \$5,000,000. The directors are William H. Workman, New York; Harry Clark, Montreal, and Julius Frank, Smith L. Sawley, and Cecil Brownlow, of Ogdens-

Mr. William Workman represents the Handley-Page Company of England in the United States. It is not known whether British or American built Hand-ley Page planes will be used on the passenger and express routes to be established by the company.

Aerial Passenger Service Links Chicage With North Shore Section Chicago, Ill.—An aerial taxi service is to be established by the Chicago Yacht

The plan, as outlined by Charles H. Thorne, commodore of the club, is to operate a line of flying boats between the "exclusive north shore residential sec-tion" and the yacht club for members who desire to avoid the necessity of commuting by train and prefer the modern and comfortable flying boat.

Aerial Exhibit for Houston and Galveston A portable building to house a perma-nent aeronautic exhibit consisting of aeroplanes, motors, aeroplane guns, bombs, in-struments and accessories, is being assem-bled at Galveston, Texas. Plans for the preparation of a similar exhibit at Houston are being completed

Champion Spark Plug Salesmen Hold

Convention
Toledo, Ohio,-One hundred and twenty-five salesmen from all parts of the

United States and Canada have assembled for the semi-annual Sales Convention of the Champion Spark Plug Co. to lay plans for the coming campaign under the di-reciton of F. B. Coswell, sales manager of the Company.

Landing Field for Chicago and Milwaukee Curtiss Distributor George Browne, Curtiss distributer for Milwaukee and Chicago, has leased prop-erty near the Blue Mound Club, Milwau-kee, for an aeroplane landing field. He we establish a passenger-carrying service and also a flying school,

erty Fuel to Be Produced in Quantity Chicago, Ill.-Mayor Zimmerman, who ras identified with the development of Liberty fuel during the war, which it was announced some weeks ago, adds ten miles per hour to the speed of aeroplanes and costs \$1.00 per gallon to produce, is soon to be placed on the market. Methods of manufacture have been evolved which will reduce the cost of production,

L. J. Martin Buys \$10,000,000 Worth of Aeroplane Linen

London, England .- A sensational oneman deal was reported recently when, for \$10,000,000, the complete stock of linen held by the aircraft equipment section of the Government Disposal Board, about 30,000,000 yards, was sold to Leonard J. Martin, of the London Minories, who paid a check on account and signed a contract made in the first place for covering

This great bulk of linen represents roughly three-fifths of a year's output of the Belfast looms. aeroplane wings.

Curtiss Company Sending Mission to South America

With agencies already established in the Far East, the Scandinavian countries, Australia and Cuba, the Curtiss Aero-plane and Motor Corporation is now plan-

ning to extend operations to South America where, at the present time, planes of foreign make hold sway owing to the failure on the part of American builders to cultivate business relationships with

or Pan-American neighbors.
On July 1 the Curtiss company will send a mission of expert aviators and mechanics to South America in order to demonstrate American aeroplanes and seaplanes to the officials of the Latin-American governments, corporations and develop aviation along military and com-mercial lines.

The mission will be headed by C. W. Webster, supervisor of sales for South America, and among his pitots will be Orten Hoover and Lawrence Leon, two of the best-known pilots in the United Hoover has been flying since tates 1910 and in 1915 he was sent to Brazil to inaugurate aviation for the government. Leon has also had considerable flying experience in the South American coun-

On the same vessel will go the first large shipment of aeroplanes ever sent to the Latin-American countries. chines that will be taken include the JN-4D land machine, which was used as a training plane by the American and Cana-dian governments; the new three-passenger Oriole, the world's first commercial aeroplane; the Wasp, a land machine, de-signed by the Curtiss company as a fightsigned by the Curtiss company as a nght-ing plane and which, in tests, made a new record of 163 miles an hour and a climb-ing record of 16,000 feet in ten minutes; the OX-5 motor, used by the government in training planes, and the new Curtiss K-6 and K-12 motors; and the Seagull.

the three-passenger flying boat.

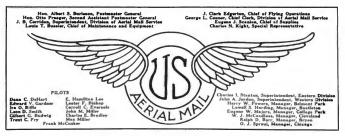
Bases will be established throughout South America and the first will be at Buenos Aires and Rio de Janeiro; later bases will be established in Uruguay, Chile, Peru and Paraguay. Demonstratng machines will also be sent to Colum-pia, Venezuela and Bolivia.







The Curtisa mission to South America. From left to right; Lawrence Leon, C. W. Wehster and Orton Hoover



Preparations for New York-Chicago Aerial Mail Route Being Completed

Aviators of the aerial mail division of the Post Office Department are flying daily from Belmont Park out over the route between New York and Chicago, so that when the aerial mail delivery starts they will be familiar with the territory over which they will fly.

The eight hour mail service between New York and Chicago will be in operation by July 1 at the latest, and may be inaugurated some day next week. Mail will be carried in three flights between the two cities. Bellefonte, Pa., and Cleve-land, Ohio, are the intermediate stations on the route.

The principal difficulty experienced by the aviators so far is the tendency of the generators of the motors to short circuit in the heavy early morning mists over Long Island. The pilots have gathered in their experimental flights much valuable information concerning prevailing air currents, emergency landing places, etc., which will make their flying easier A system of landmarks is beand safer. ing established and amplified so that the pilots will not go astray.

It is said that private individuals, confident of the future of commercial aviation, are attempting to obtain Government contracts to carry aerial mail west of Chicago in big three and four motored planes. The Post Office Department is considering their applications.

Extension of Mail Service to Omaha and St. Louis Planned

Aeroplane mail service to Omaha and St. Louis, thus shortening the "business correspondence distance" between the Atlantic and Pacific coasts by sixteen to twenty-four hours, will be in operation by fall, judging from results obtained on the Cleveland-Chicago route, an analysis of which has just been compiled by Second Assistant Postmaster General Otto Praeger, in charge of aerial mail.

Reports show that fifty-eight consecutive trips of 325 miles each have been made between Chicago and Cleveland without delays, without forced landings and without engine trouble of any sort. These flights have been made in weather which, a short time ago, would have been regarded prohibitive. Each day, each way, the "ships" carried 400 pounds of letter the "ships" carried 400 pounds of letter mail. As letters range from forty to forty-five to the pound, this means that 16,000 were transported on each trip.

Notwithstanding the inclement weather and the heavy loads, the postal planesbuilt De Havilands, equipped with Lib-erty motors—maintained an average speed of 98.5 miles an hour. On one occasion, when a squall prevailed throughout the lyze shipping in Chicago harbor, the mail plane reached Chicago on time and made a perfect landing on the Postal-Army Field in Grant Park. On another occasion a successful trip was made notwithstanding heavy rains which flooded the field at Bryan, Ohio, to the depth of a foot. On numerous trips fogs, which interfered greatly with both land and water traffic, failed even to delay the air mail. reason was that engine and plane per-formed faultlessly, and that the pilot, in addition to knowing his course, was a competent navigator.

Twelve of the De Havilands are in the Cleveland service, four being stationed at each terminal and four at Bryan.

The service shows some interesting me results. Short as this link is, in time results. Short as this link is, in comparison with a transcontinental line, Pacific Coast mail is even now advanced sixteen hours to Boston and New Eng-land points. The reason is that hy speeding up a few hours at a vital point, the mail reaches its destination in time for afternoon delivery instead of the following morning. Pacific Coast mail, routed via aeroplane line, is delivered in New York in the morning instead of the afternoon.

Westbound, a similar saving is achieved by taking the mail from the 7 A. M. ex-press at Cleveland, transferring it to the postal plane, and carrying it on to Chi-cago at almost double the speed of steam transportation.

From now on the mail planes will leave Chicago for the East at 2.30 P. M. It was found that 151 great business concerns sent special messenger mail each noon in an effort to catch the two fast mail trains to the Atlantic seaboard. This meant that much of the correspondence had to be completed the night previous. The 2.30 aeroplane service means that often eight hours to an entire day is saved, and even n the case of the special messenger delivery to the train from two and a half to three hours are saved. Incidentally, the ability of the aerial mail to land at and take off from Grant Park, which is in the heart of Chicago, is further evidence of the need for landing fields within the cities. Then complete advantage is taken of quick transportation offered by the aeroplane.

The mails are constantly growing heavier, and it is a problem to find sufficient rail equipment. Satisfactory operation of the air mail between Cleveland and Chicago has thus been the means of relieving congestion, and one distributing car each way each day has been cut from that division. Distribution of aeroplane mail is done in the post offices. This means that \$52,000 yearly is saved, while at the same time rail equipment is released for service elsewhere and mail expedited

The department is able to state that experiments are now being carried on looking toward the delivery and taking aboard of mail bags while the aeroplane is in flight. It is not so many years since it was thought remarkable for a fast steam train to accomplish this feat. It is now regarded as possible for the lightly loaded "ships"—those carrying 1,000 pounds of mail or less—to come close to It is earth and snatch bags from specially prepared apparatus. In the case of the large multimotored "ships," for which the department shortly will let bids, no attempt will be made to come near the ground, but a scheme is proposed for dropping mailand possibly taking on-from the roofs of buildings. If this proves practicable it will be possible, on the New York-Washington route, to make non-stop runs, serv-ing both Philadelphia and Baltimore and eliminating fifteen minute stops at each

Another interesting development which it is now possible to announce is the construction of fireproof walls between the mail compartment and the engine, and the compartment and the gas tank. A fireproof, airtight bag exactly the size of the compartment will be installed, and within this a second fireproof bag containing the mail pouch. In this manner, tests have demonstrated danger of destruction by fire is practically eliminated.

First Reply to Trans-Atlantic Aerial Mail Received

Washington, D. C .- When Commander Read hopped off at Trepassey Bay for the first successful transatlantic flight in the naval aeroplane NC-4, he took with him a letter from Mr. Harold Braddock, Director of the Savings Division of the Treasury Department to Sir Ribert Kindersley, K.B.E., Chairman of the British National War Savings Committee conveying the grectings of the Savings Division of the United States Treasury Department to those in charge of the British Savings Stamp campaign. According to a press dispatch a reply from Sir Robert has been received, which is said to be the first answer to transatlantic aerial mail.

the section of the latest designation of the														
COMPANY	Unit Construction Company	Thomas Morre Arcraft Corporation	Aircraft & Engineering Corporation	Corporation 6	Laurence Lowis Aeroplane Co.	Affred W. Lawson	LII	LWF	Astromatine Plate and Motor Co.	Lawron Aidine Transporta- tion Co.	G. Ellas & Bro.	Glean L. Martin Company	British & Colonial Airline Co.	Charles B. Kirkland
Span Upper	76' o.H."	40,0,1	ob' triplane 30'	76'	76,	,00,001	(11)	(K)	,00 jg	,0,99	106'	,,3 ,16	81, 8.,	,3,49
wayth	1,140,00	36' 6"	42'2"	48,6"	,09	,,01,09	"770 ,98		cz' 8"	"> o' o'	18, 6,1	,,0,,,10	61, 6"	41, 67
Keight	14,04"	10,01	30	19,	.92	10.0,,	12, 6,,		18.	14.6"	.01	12,2,	30, 8,,	13,-18,
Chord Upper	0,191,6	8' 10''	7'3"	12,	13,	10, 0,,	=		12,	2,6,6	,5,0	1, 10,,	8, 6,,	Not known
ap	8, 9 14.7	0,3,,	9,4	1.81	o' o" variable	10, 3,,	11,		10, 2,,	,0,6	,11	8, 0,,	Not known	None
Medral	None	3.04	5° lower outer panel	None	Revorse	Yes	2º lower		0.00	19%	0.00	None	Yes	13%
Stagger	None	None	None	None	4.0	None	None		None	None	None	Notice	Note	None
Sweephack	None	None	None	None	None	Yes	None		None	99	None	None	Yes	None
Wing curve	Unknown	R.A.F. 15	Sloate	R.A.F. 15	Laurence a	USA 5	U.S. 6		Unknown	U.S. 9	RAF 5, upper RAF 6, lower	R.A.F. 15	Not known	RAF. 15
Area	1378 sq. ft.	750 sq. ft.	1 500 Aq. ft.	1740 sq. ft.	1700 sq. ft.	2220 sq. ft.	2,300 sq. ft.		2,935 sq. ft.	1,672 sq. ft	2,044 sq. ft.	1,070 AQ. ft.	1,905 19. ft.	1,030 sq. ft.
Motors, type and at- rangement	3 Lib. 12's 2 fractors 1 pusher	2 Hs 300's 1 tractor 1 pusher nacelle	to de pusher oppied along center wing	z Lib. 12's geared fus. tractors	2 Lib. 12's wings	3 Lib. 12's 3 tractors	3 Lib. trac. 2 fus. 1 sac.	P-Joo HS between 2 fut.	3 Lib. 12's 3 tractors 2 wing	a Lilb. 11% wing	s HS 300's s shafts to wing props.	2 Lib. 12's wing	4 Lib. 12's 2 pushers 9 tractors	3 Lib. 6'8 greated 480 H.P.
Weight full foad (fbs.)	13.137	8,608	000'6	13.000	12,000 to 15,000	14,880	18,500		054'51	12,101	15,700	9540	17,750	8,330
Jos. per H. P.	12.5	8 38	35.0	16 25	30 2	13.4	15 41		. 15	16 3	17.4	11.8	11.9	17.5
load per sq. ft.	0.37	7 0	9	7.5	90.00	6.2	5.4		7.5	2.2	1.1	8.84	6.6	80 8
Gasoline Consumption Lbs. per H. P.	-53	34	9,	25.	23	.83.	- 53		25:	83:	3,	25.	23:	Not known
figh Speed. Miles per hr.	101	123	100	110	001-00	100	=		50	310	80	801	12.5	311
Climb	10,000' in 22 min.	10,000' in 1,4 min.	Not known	pfo' per min.	950' per min.	8 to' per min at 6,000'	Not known		6,000' in 18 min	Not konwn	7,30' per min.	10,000' in 30 min.	10,000 in 30 min	10,000° in 18 min.
Service ceiling	15,000	18,000	Not known	13,000	\$1,000	23,000	14,000′		15,000	15,000	15,000,	14,000	1,000,1	10,000
Buoyancy Speed	50-60	5.3	16.	80-60	50-50	47	S		90-06	90	2,	50-23	53	95
Cruising Speed	85-95	100	8	8	9 hrs. endr'ce	88-98	105		8	176	06	8	90-100	20-80
Price	\$33,070	\$16,6ga	\$49,500	\$29,500-10 \$32,500-5 \$10,500-3	\$26,500	\$28,000 with 3 Lib. \$21,000 without	\$35,000	\$14,950	\$45,000-10 \$50,000-3-5	\$24,000	844.500	\$31,600	806,132	\$34.250
Mail load and range	2.700 fbs. at 5 to hrs.	1.506 lbs. at 539 hrs. eeo miles	at 5 hrs.	3.000 lbt.	3.900 lbs. at 6 hrs.	3,500-4,000 lbs.	2,000 lhs. at 10 hrs.		3,000 lbs. at 6 km.	5 hrs. 450 mi	3,000 fbs.	1,500 lbs. at 535 hrs.	2,600 lbs. 6 hrs.	1,500 lbs at 8-9/10 hrs.
Fuselage and navelle arrangements	2 fus. 1 hac.	2 fus. 1 nac.	t fus.	1 fue.	ı fue.	1 fus.	2 fest. 1 mac.	z fess- 1 mac.	1 fus. 2 wing motors a	r fus.	1 (n).	r fus.	1 fes.	ı fus.
Equipment	With tmotore	Without	With	Without	Without	Without	Without		Without	Without	Without	Wiebcut	With	Without



NAVAL and MILITARY ~ AERONAUTICS ~



27,000 Miles of Recruiting Flights in One Week

Washington, D. C.—In addition to the thousands of miles of flying at active aviation fields giving instruction to en-listed men, forest patrols and other flights of demonstration in which acrobatics were a feature, the cross-country flying made by the U. S. Army aviators for the week ending June 14th in the interest of recruiting and reported to the Director of Air Service aggregates 27,469 miles.

Board to Select Aerial Coast Defense Sites Along Atlantic

Washington.-In connection with the plan to revise the basic coast defense system of the United States, a board of officers was appointed by the War Departmeets was appointed by the War Department recently to select suitable places along the Atlantic Coast for additional "aerial coast defense sites." Cities to be visited include Portland, Me.; Boston, Newport, New London, New York, Washington and Charleston, S. C.

Twenty De Havilands at Fort Monroe Target Practice

Hampton, Va.—The Seventy-fourth Aero Squadron, demobilized at Mineola on January 14, has been ordered reformed at Langley Field in order to work at the practice manoeuvres of heavy artillery at Fortress Monroe. Twenty De Havilands will be used.

Fliers Ha 2,400 Miles Have Traveled Dallas-Boston

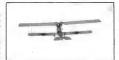
Indianapolis, Ind.—The Dallas-Boston fliers, Colonel H. B. Claggett, Commandniers, Coionei II. B. Claggett, Command-ing—five De Havillands—record cross country flying to June 17 2,390 miles in 1,556 minutes, were scheduled to leave for Dayton, Ohio, June 19th, and to arrive in Boston June 20th or 21st, making one stop between Dayton, Ohio, and Boston, either at Buffalo, N. Y., or Schenectady, N. Y.,

Naval Scaplanes Fly From Gulf to Chicago

Chicago,—Two navy seaplanes completed a trip from New Orleans to Chicago on June 12, when they salighted in Lake on June 12, when they salighted in Lake Street at 10-30 o'clock, completing the final leg of the flight from Peoria, III, where unfavorable weather forced an interruption of their flight from St. Louis. The planes were piloted by Lieut. Commander Stanley and Ensign Arthur.

American Aces Now Total 69

The number of American aviators who have downed five or more enemy aer have downed hive or more enemly aero-planes now totals sixty-nine by the addi-tion of Captain Vietor H. Strahm, pilot; Captain Everett R. Cook, pilot; Captain Leonard C. Hammond, observer; First Lieutenant William T. Badham, observer reported from Le Mans, France, under date of May 10, 1919.





Upper view:—The Elliogton Field Hospital plane, of which Lieut, Feterson was pilot when on instructor in acrobatics.
Lower view:—Lieut, Harold G. Peterson, on duty at Ellington Field since it was opeoed, is one of the most skilled acrobatic filers in the service

Lieut. Peterson Ellington Field's Most Daring Acrobatic Flier

Houston, Tex. — See ond Licutenant Harold G. Peterson, who has been on duty at Ellington Field since it was opened up in 1917, is one of the most skilled and daring aerobatic flyers of the Air Service. Lieutenant Peterson is a graduate of the University of Illinois ground school and was sent to Ellington Field as a cadet to help open up the field. For two months after receiving his commission on February 9, 1918, he instructed in acrobatics, following which he was assigned to duty as Hospital Ship pilot.

He was the first man to land an aeroplane on the Boulevard at Galveston, For this purpose the tail skid of ship was wrapped with canvas to help drag tail on slippery brick movement. Boulevard is suppery prick movement. Bolilevard is forty feet across, with low fences and buildings on one side and the sea wall with a twelve-foot rocky drop on other. With a twenty-mile cross-wind, Peterson had to use all his skill in guiding the ship to a straightaway landing in this narrow This was the first hospital ship to be landed in the heart of any city and was witnessed by a large number of enthusiastic civilians. Peterson was immediately arrested by the Galveston police for fast and reckless driving of the aeroplane over the Boulevard. Colonel Lawrence W. McIntosh, Ellington's popular Com-manding Officer, managed to appease the overzealous "cops" and had Peterson released

At the Ellington Flying Frolic in April, Lient. Peterson delighted the crowd of 15,000 with a thrilling exhibition of cir-cling water tower in tight spirals, loop-ing through the clouds, which hung ominously low, 100 feet over the ground, and coming out of loops and tail spins just over the ground. His exhibition pre-vented postponement and disappointment to the visitors

Fast Flight From Portland to Sacrament Lieutenant William R. Beck in a De Haviland 4 made a flight from Portland, Ore., to Sacramento, Cal., 500 miles with one stop at Grenada in 325 minutes' flying

In crossing the Sierra Nevada Moun-tains at an elevation of 12,000 feet, Lieutenant Beck encountered dense clouds, rain and snow.

New York-Seattle Mapping Trip Planned By Air Service

Washington, D. C.—In the interest of recruiting and for the purpose of chart-ing, laying out an aerial mail route and

ing, laying out an aerial mail route and collecting data as to municipal and emergency landing fields, a special transcontinental flight will be organized by the Air Service of the Army to leave Hazelburst having as its destination Seattle, Wash. The tentative route will be across the Sustes of New Jersey, Pennylvania, Ohio, Indiana, Illinois, Wisconsin, Minneston, Sustes of New Jersey, Pennylvania, Ohio, Indiana, Illinois, Wisconsin, Minneston, will be made at Philadelphia, Pittsburgh, Columbus, Indianapolis, Chicago, Milwaumer, St. Paul, Minneapolis, Fargo, Bismarck and other points en route. A dismace of some accommendation of the covered many control of the covered many control of the covered of th Balloon.

The feature of the trip will be the observation balloon demonstration. This will be transported on trucks and inflated at several of the places where stops are made. The observation balloon will be the Type R used on the front. The motor transport equipment will eonsist of commachine shop with all the repairing machinery necessary carried on trucks and lorries. Special attention will be given to photography that when the trip is finished no data will be lacking for the laying out of a perfect aerial lane from New York to Seattle.

The personnel of the party has not yet been decided but it will consist of sixteen officers and thirty-six enlisted men. Eighteen to twenty weeks' time will be devoted to the work and the results determine the route of the return trip.

Air Service Demobilization

Washington, D. C.—According to reports received from the Air Service the net decrease in the total commissioned and enlisted strength from the date of the armistice to June 5 was 80 per cent. The following table shows the present

distribution of personnel as compared with the figures of November 11 and per cent decrease. The June 5 figures do not include 284 officers and 433 enlisted men on detached service or at demobilization

camps awaiting discharg	e.	Per cent net
Nov. 11	June 5	decrease
Cadets 6,485	187	97
Enlisted men. 170,436	33,461	80
Officers 20,852	4,946	76
Total197,771	38,594	80

During the week ended June 5, 1919, During the week ended June 5, 1919, the decrease in the Air Service personnel overseas was 620 as against a weekly average of 3,083 for the past month.

The strength of the Air Service in the U. S. and overseas on November 11, January 30 and June 5 is shown in the following table:

following table:

Overseas

Nov.	11	119,882	77,889
Jan. June	30	46,919	57,527
June	5	15,249	23,345
	-	_	

General Menoher At Airnaut Club of Washington

Washington, D. C.—Major-General C. T. Menoher, Director of the Air Service, was the chief speaker at the meeting of the Airnaut Club of Washington at the June 2 meeting. Lieut.-Col. S. C. Clark presided.

Mr. M. W. Perley was elected President of the club. Other officers chosen were: First vice-president, Mrs. Catherine E. Warren; second vice-president, Miss Anna P. Ross; secretary, Louis E. Florey; treasurer, Albert Lariviere: to the board



Captain N. B. Hall, U. S. Coast Guard officer in charge of inspection of all navy power plants and planes for the Broaklyn Aeronautic District, comprising Naw Jersey, Southern New Yark and Consecticut

of governors, Mrs. Eleanor Belyea, Capt. H. C. Sigourney, Miss Rosly Carli and S. N. Bernhardt.

Special Orders Nos. 135 to 139, Inclusiva Capt. Byron H. Mills will proceed to Kelly Field, San Antonio, Tex.

Lieut, Col. Davenport Johnson, Jr., will pro-ceed to Chicago, Ill., on temporary daity for the purpose of conference with the department Air Service officer, Central Department; thence to Selfridge Field, Mount Clemens, Mich., take station, assume command.

Capt. Charles W. Drew will proceed to Sel-fridge Field, Mount Clemens, Mich, and report ingo arrival to the commanding officer for duty with the first oursuit group at Selfridge Field.

First Lieut. John W. Frewer will proceed to llazelburst Field, Mineola, Long Island, N. Y.

First Lieut. James G. Hall will proceed to the United States Naval Air Station, San Diago, Cal. Second Lieut. Charles M. Potter will proceed to Langley Field, Hampton, Va.

Second Lieut. Mark H. Redman will proceed to Dayton, Ohio, and report upon arrival to the chief Engineering Division, Air Service.

Second Lieut. John Earle Brown will proceed accompanied by the necessary attendant to Gen-eral Hospital No. I, New York City, and report in person to the commanding officer, that hos-pital, for further Ireatment.

First Lieut. Junius H. Evans, Air Service, is attached to the Motor Transport Corps, and when he can be released from his present duties will report in person to the commanding general port of embarkation, Hoboken, N. J., for assignment to duty with the motor transport officer, 461 Eighth Avenue, New York City.

Second Lieut. James Roy Barker will proceed to Fort Snelling, Minn., and report to U. S. A. General Hospital No. 29 for duty.

The following named officers will proceed to Kelly Field, San Antonio, Tex.: Capt. Robert V. Gallagher, First Lieuts. Parker V. Ahl, Morris Berman, Second Lieuts. Cecil E. Archer, J. Harold Carroll, (Continued on page 788)

TRANS-ATLANTIC FLIGHT PLANS

R-34 Ready to Start on Trans-Atlantic Flight

London.-The British dirigible R-34 is ready to start on the trans-Atlantic flight. She arrived on June 20 at East Fortune. Scotland, after a 56-hour test flight, which took her into the Baltic for the twofold purpose of learning whether there was and to further test the machine before at-

tempting to fiy across the Atlantic.

The giant machine had a rough trlp, and it is unlikely that she can be ready to start for America under ten days, the earliest estimates being a week. Just how far she proceeded up the Baltic it is im-possible to learn, as the Government has cautioned the officers and crew against saying anything with regard to the trip. is learned, however, that the ship went abreast of Berlin, just outside the threemile limit.

The airship battled against a strong westerly wind during 20 hours of the homeward journey. Colonel Hunt, commanding the station here, has suggested to the Air Ministry that the flight across the Atlantic be postponed for a fortnight. It is estimated that the total round trip of the Baltic totaled 1,200 miles.

The R-34 will not not fly to the United States as planned until the German decision to sign or reject the peace terms is made. If the Germans reject the allied terms her cruise may be eastward on a less friendly mission than her visit to America.

No official word, however, that the flight of the big British dirigible R-34 to nign or the big British dirigible R-34 to this country has been postponed has reached Lieut-Col. Frederick W. Lucas, R. A. F., who is in this country to pre-pare for her coming

Special wireless communications regarding weather conditions are now being sent out to aid the pilots of the big dirigible in planning their voyage. The messages will be extended as soon as the start is made and the information sent in much greater detail. Regular signals will be sent out to assist in guiding the air voyagers from wireless stations at Bar Harbor, Boston, Newport, New York and Cape May. At Roosevelt Field another radio station is to be set up to communicate between the ship and the ground while the landing is being made.

Handley Page Waiting for Good Weather at Harbor Grace

Harbor Grace, N. F .- With all prepara-Harbor Grace, N. F.—Win an prepara-tions and tests completed, the four-mo-tored Handley Page is still waiting for favorable weather. Despite their eager-ness to get away, however, it is by no means certain that they will depart at once, as they are determined to await an ideal wind, since otherwise the task they have set themselves of beating the Vimy's distance record is hopeless. Admiral Kerr and the other fliers are particularly anxions to depart for fear that there may be some change in the plans ordered by head-

quarters. Major Geoffrey I. Taylor, meteorological officer of the expedition, is in St. John's, camping close beside Lieutenant Lawrence L. Clemens, the Air Ministry meteorological officer, to whom come all officialweather reports. Major Taylor will flash word here the moment he decides conditions are suitable for departure.

The Alliance Aeroplane Company, Limited, of England, which had completed all preparations for sending its biplane Seabird to Newfoundland to attempt the ocean crossing, has canceled all arrange-ments and withdrawn its entry. Word of this was received from the firm by its advance representative, Lieutenant Williams,

at St. John's recently.
Plans of the Boulton and Paul Company to start two fast planes to Ireland have been abandoned, according to a cable mes-sage received here by Major Fiske, the representative at St. John's of the British

Alcock and Brown Given Knighthood in Order of British Empire

London.-When Captain Alcock and Lieutenant Brown received, at the hands of War Secretary Churchill, not only the of war Secretary Churchil, not only the Daily Mail's \$50,000 prize at the Mail's funcheon in their honor on June 20th, but knighthood in the Order of the British Empire, bestowed by the King, there had ensued, unknown to hundreds present, a little dialogue between Brown and American Ambassador Davis.

Brown wanted to know if he would jeopardize his American citizenship by accepting knighthood. The Ambassador relieved his mind by telling him that as a private citizen he had every right to ac-cept it. So Brown becomes Sir Whitten Brown, and the Vickers-Vimy pilot Sir I. Alcock.

Besides the Daily Mail prize, the airmen received \$10,500 from a cigarette company here and \$5,000 from another source. his speech Brown said they decided before leaving St. John's to invest the money in the British Joy Loan.

Brown intends, after his marriage to Miss Kennedy, early in July, to return to America



FOREIGN **NEWS**



Entries for Australia-England Competition Received

Mr. Bert Hacke for Australia-England Competition Received Mr. Bert Hacker is the first strains to center for the Australian Conference of the Australian Conference of the Australian Conference of the Conference

London-Birmingham Passenger Service

The first passenger aeroplans from London to Birmingham Insted at Brownich Carlo Brownich Carlo

Parsoval Building 78-Passenger Dirigible
It is announced from Bitterfield that the Parseval Works have almost
completed the construction of a giant airship, capable of carrying 75
people. It will be used for crossing the Atlantic.

Book Proofs by Aeroplane Save Publisher Two Months Mr. Parick Thompson is publishing Gestatia to adjection of tales on many parick the ground of the ground of the ground of the son sagned to the ordinary land and sea mail service on March 7th, took nearly two months to reach him. After correction the proofs were certrasted to some friends from 110 Squadron on their way back from the halfway areforeme on the Foliestone-Cologna are mail route and handed to the first home-going pilot. The packet left at 11:30 a.m. and was in the publisher's hands that night.

Winston Churchill is Taking Flying Lessons

Mr. Winston Churchill has resumed his flying lessons, which were interrupted at the beginning of the war. He is going through his course at Honnslow on an Avro machine in charge of an R. A. F. instructor.

Netherlanda Government Purchasing Planas for Java and East Indies The Netherlands East Indian government is considering the purchase of twenty aeroplanes of the bombing type for operation between Japan and the islands it owns in the Far East. Although intended for commercial use, it is planned to have the aeroplanes for military reasons should the occasion arise.

British Columbia Mining Company to Use Aeroplane Transport The Queens Mines, Inc., of Nelson, B. C., are negotiating for the purchase of aeroplanes to operate between their Nuget Mine, on top of a mountain, and the coast, fifteen miles away.

Brussels Gets Live Lohster fram Paris by Aeroplane Brusseis Geta Liva Lobater fram Paris by Aeroplana Brusseis.—Regular transportation of merchandise by aeroplane between Brusseis and Paris, established by companies in the two cities, as already regulated in companies in the two cities, and the companies of the control of the

Aerial Service for Brazil

Unifor the terms of all Service for Brasill

Unifor the terms of a Brailian operament decree, as politized in
the "Datio Cheen" of Brailian operament decree, as politized in
the "Datio Cheen" of the "Datio Cheen" of the "Datio Cheen" of
Araulo Goes are empowered to establish an aerial service, without
privinger on mosolopy, for the transport of passeagers and mails between
years are allowed for the establishment of the service, but an extension
of time may be grasted. The service is intended principally for past
The timestable and tarse will be fixed with the approval of the government, and will be revised every there years.

31 British Companies Are New in Aeroplane Insurance Combine London.—Thirty-one British insurance companies are now in the aviation accident and liability insurance combine which has pooled liabilities and premiums.

English Hatel to Have Air Service

It is stated that the Birkdale Palace Hotel will shortly begin a private air service. Guests from the Isle of Man or Blackpool who wish to travel by air will be waited upon by hotel aeroplanes. This is believed to be the first hotel air service in Europe.

Thos. Cook and Co. Arranges Aerial Toura

Thos. Cook and Ce. Arranges Aerial Tours

Evidence that the commercial development of the aproplane is proceeding by leaps and bounds is indicated by an advertisement inserted the agency advertised acroplane grants, in the London Times during the Easter builded, More than a thousand men, women tratefulding, on Easter Munday, More than a thousand men, women control of the control of the disportantly and for two guiness each had a half bour flight recitations. Healthy Dage machines were used in the flights.

Shanghai-Pakin Passenger Servica Being Arranged by Pakin Syndicate

The Pekin Syndicate, Ltd., has recently pur-chased several Handley Pages to operate a line hetween Shanghsi and Pekin, a distance of 700 miles. A fast passenger and mail service will be established.

Casala Again Sets New Altituda Record Villacoublay,—Adjutant Casale, the French Villacoublay,—Adjutant Casale, the French Villacoublay, and the Villacoublay of St. 168 feet recently, broke his own record on June 14 by ascending in his aeroplane to a height of 10,100 metres (approximately The flight was made in fifty-five minutes. The temperature at the high point was eight degrees below zero.

All Air Force Planes Required to Have London.—Compulsory fitting of life-saving parachutes to all aeroplanes of the Royal Air Force has been decided upon by the govern-nient. Whether this will be applicable also to commercial aircraft has not yet been settled.

Catches Aquitania by Aeroplane

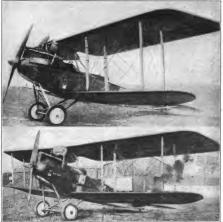
London.—After missing boat and train to Southampton on June 14 for the Cunard liner Aquitania. Mrs. Leon Errol adopted the novel method of flying by aeroplane to the port of

embarkation.

She obtained an aeroplane at Hounslow, from where ascent was made. After a flight of an hour and fifteen minutes the machine descended five miles from Southampton, where she was met by the captain of the ship, who motored her to the docks, eatching the boat.

Parachute and Collapsible Boat to Make Over-Water Flying Safer

Rome.—The trial of a new parachute was carried out on May 9 over the sea off the port of Antio. The parachute, with Lieut. Essertant, with special collapsible pneumatic boat, was asfely launched. Lieut. Emeron alighted on the water from a height of 420 metres, and then got into the boat.



ered by a 260 H.P. mater Twa views of the German Rumpler CIV general utility hiplane,



ELEMENTARY AERONAUTICS

MODEL NOTES By John F. NYKahon



THE PART CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB 921 Ravenna Bouleverd, Seattle, Wash. BAY RIDGE MODEL CLUB 730 Ridge Bouleverd, Bay Ridge, Brookly INDIANA UNIVERSITY AERO SCIENCE CLUB

Bleomington, Indiana
BROADWAY MODEL AERO CLUB
SI North Broadway, Ballimore, Md
TRIANGLE MODEL AERO CLUB
Ballimore, Md.
NEBRASKA MODEL AERO CLUB
Lincola, Nebraska

DENVER MODEL AERO CLUB 2820 Raleigh St., Denver, Colo. BUFFALO AERO SCIENCE CLUB

Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
om 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bidg.,
Indionapolie, Indiana
MILWAUKEE MODEL AERO CLUB 455 Murray Ave., Milwoukee, Wis

CONCORD MODEL AERO CLUB e Edward P. Warner, Cencord, Mar MODEL AERO CLUB OF OXFORD MODEL AERO CLUB OF OXPORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
TOWN Weshington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bidg. E. 2376
N. Y. City St.
AERO CLUB OF LAME TECHNICAL
HIGH SCHOOL
HIGH SCHOOL
Sedgwick & Division Struct, Chicago, III.

HE accompanying cut shows a reproduction of the prizes which ARRIAL Age is offering for the Model Control which Aerial Age is offering for the Model Contests which are now going on throughout the country. Hundreds of model flyers are striving to win the cup and the medals. The cup is a work of art and, with the inscription engraved on the front, makes a very appropriate prize for the best construction model. It was intended at first to offer a bronze cup with silver trimming, but this was later changed to one of silver with a gold lining. This cup is the goal to which many experienced model builders are working, and from the photographs and descriptions received by this department, the winning model will be a work of art. Some of the scale models of which details have been received can fly, and, of course, this will be a point in their favor when the winner is declared The way the winner is decided is very fair. Should a good scale mode be capable of making short flights, it would, of course, be declared better than the one that did not fly. Then, on the other hand, if an exceptionally well-constructed and designed model should come along, it would be given preference over one

that could fly. medals The on each side of very well designed, as the reader can see at a glance. Any one of medals these would make a watch fob, if winner should not care to use it as it is A full list of the winners will appear the first available issue of the July numbers, as well as photographs and specificaof the machines.

It is requested that all those who have not as yet sent in their reports of flights do so without further delay, as it takes time to judge the qualities of the models. If you should send them early, the winner could be

declared without waiting until the summer is too far gone.

Light Flying Boat

With the next issue is started a design of a two-seater flying With the next issue is started a design of a two-seater nying boat of low horse power and very light weight. Since the Ford Motored Aeroplane was described on this page some months ago, the writer has been asked by numerous flying enthusiasts to tell through these articles whether the ord Motored Aeroplane could be fitted with pontoons. did not endeavor to answer this question at that time because tests were being made with one of these machines to deter-mine the reserve lifting power, and until these tests were completed nothing could be determined.

We have since found that the Ford develops much more horsepower at the propeller than was first supposed, and we do not hesitate to say that the machine was was described on this page can be made to rise from the water with light-weight pontoons. We can be closer in our figures for the flying boat now that we know exactly what power the Ford will develop. In order to



sautiful prizes shown shove were made and designed by the Arthur Johnson Company. These are the originators of aeropiane jeweiry and they bave turned out the best workmenship possible to create the media: and trophy for the Aerial Age winners.

get sufficient power from the Ford, it is necessary to have it running at about 2,000 R.P.M. with propeller of 6 foot diameter and pitch of about 32 inches. when connected direct, or to have the propeller geared down, that is. to have the engine running fast and the propeller running at half speed. This combination gives more horsepower, and a propeller of 7 foot diameter with 41/2 foot pitch can be used instead. This will give us enough pushing power for the flying boat to be

described later.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Vikings of the Air

Like Norsemen bold who launched their sturdy craft on seas that stretched beyond their furthest leen. And drank deep draughts of ocean's briny air With keen delight, and salied they knew not where, So stand ye at the Atlantic's mist-bound shore, Ready to leap into the buoyant air—Ready to span, with wings outstretched on high, the ocean turbulent, 'neath the wind-swept sky.

Knights of the air, on high adventure bound, Our hearts with yours in unison do beat. Faint not nor fear to risk the uncharted way And taste the glories of the risen day. Like you, we, too, into the unknown launch! Each morr a misty vista debt unfold: Each morr a misty vista debt unfold: Each morra in the rise to the rise to the property of the control of the rise of the but all our paths are in the Pilot's sight. —Josephine M. Fabricant in the New York Times,

Has your left shoe one of these new aeroplane tongues? One that has a tendency to sidestep?—E. L.

In "Civies"

Where are the girls who used to smile, And the rides I used to get, And where it the crowd that was very proud To pass me a eigarette? Time was I danced with maidens fair And captured their hearts by storm, But I've lost my pull with the beautiful Since quitting the uniform.

I've sunk my shoes into Turkish rugs
That only the rich can own;
At tables fine I've been asked to dine,
In the heart of the social zone,
In the cushions deep of a limousine
I have rested my minaly form,
But I've lost my graft with the tony craft
Since quitting the uniform.

I've been a king on the ballroom floor, An axe in the social whirl?

I could show my face in any old place, And never a lip would cur.

I could walk right up to a rich man's door, And be sure of a welcome warm;

But I've changed a lot, and they know me not Since quitting the uniform.

And the girls are shy when I'm standing by And they give me the tilted chin. And nobody knows and nobody cares Whether I eat or how; I must buy my own chuck, for I'm out of luck— I'm wearing the "civivies" now.

Now I walk down town and the autos pass, And nobody says "get in!"

-Edgar A. Quest in Rockwell Field Flight.

The Atlantic Flight

As the fledgling from the nest Flutters fornt to meet the wind;
As the traveller trekking West Hurries on with gladsome mind with the state of the s

Solution of a Pressing Problem

Wifey: "Darling, I've lovely news for you. I engaged a servant yesterday, and she's just arrived."

Hubby: "You priceless old thing. Hope we'll be able to

Huggy, 10s precess on sums, teep her." Oh, I hope so. Suppose, darling, you go down to the hangar, and do something to the engine of her 'plane. Then she'll have to stay a week at least."—Aircraft.

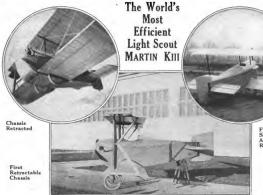


That young avistor who called oo Sis that terribly hot evening made himself good sod solid with the rest of the family

—By Footsine Fox in the N. Y. "Globe"

EVERY FIRST CLASS AEROPLANE REQUIRES A RETRACTABLE CHASSIS

EVERY FIRST CLASS AEROPLANE REQUIRES A RETRACTABLE CHASSIS



First Shock Absorbing Rudder

No other light scout of low horsepower can even approximate the performance of the K 3 for the following reasons:

- 1—The Retractable Chassis, protected by both basic and improvement patents for any shape, or method of retracting, eliminates 17% of the useless or parasite resistance.
 - 2—The K-bar Truss, acknowledged by the British Air Board to be the only rigid single lift truss, eliminates half of the useless or parasite cellule resistance.
 - 3-The Martin form of wing end, proved both in America and Europe, the most efficient shape.
 - 4—The Shockabsorbing Rudder which simplifies rudder bracing and control, provides exceptional taxing manoeuverability and eliminates the Parasite resistance of the usual tail skid.
 - 5—The Wing end Aileron, proved by actual tests in full flight to be four times as efficient as the trailing edge aileron, leaves the K 3 wing aerofoil unimpaired.
 - 6—The structure of the K 3 has a tested safety factor of eight and weighs complete with motor only 350 lbs. (Compare this with the weight of other 40 h.p. scouts.)

Exclusive manufacturing rights for a similar commercial plane designed around a reliable 40 h.p. American motor for sale for 5% of the gross sales.

CAPT. JAMES V. MARTIN, U. S. Master Mariner and pioneer aeroplane builder who originated and demonstrated in 1911 the modern tractor biplane in all its essential features, such as interconnected trailing edge allerons, tail decalage and a modern type fuselage with clamp longeron fittings.

All the Martin devices are freely at the disposal of the U. S. War Department and can be used on reasonable terms by other constructors.

Designers and Contractors to U. S. Air Service.

Martin Aeroplane Factory, Elyria, Ohio

Business Address: Reibold Building, Dayton, Ohio

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No matter what you want to insure, come to us.

We make a specialty of AUTOMOBILE policies.

Portable Hangars for J.N.-4 Curtiss

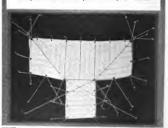
Best of Material and Workmanship. Fit like the glove to the hand. Simple as A-B-C



AIRPLANE in hangar. Note room for camp beds hat each side under top plane. Front wall closes on cable at top and lashes in center. Non-detachable page at bottom make it wind and rain



BALANCE of power for wind resistence through double crossed guys removes strain from any one point and insures perfect safety in storms.



CNREFUL tests of canvas strength have proven the value of rope reinforcement. The heavy guys shown are built into the hangar

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MARTIN BOMBER

The Bomber Performance Demonstrates Military Supremacy

The Martin Plane is First to Fulfill Commercial Requirements



Our Freighter and 12-Passenger Airplane soon to be announced

THE GLENN L. MARTIN COMPANY

Contractors to the United States Government

(Continued from page 773) correctly determine spatial relationship and direct calm, precisely co-ordinated muscular action, prevents his return to earth in a splintering crash.

That this faculty is capable of extensive development is proven daily. The rubber tires of the bicycle have no nerves, yet the trick bicycle rider performs wonderful feats in equilibration by the aid of this little organism.

Wonderful and infallable as this labyrinth appears, however, the student of this subject locates in some of its peculiarities the cause of many an aviator's faul crash. It senses rotation with remarkable accuracy, but if he rotation exceeds the detormed and then stopped, it continues to register" rotation—but in the opposite direction. This is a false impression, for the person is motionless, and on the earth is usually detected by the sense of touch, which is less effective in the sky, for the Purther, the vision is so closely associated with the semicircular canals that

Further, the vision is so closely associated with the semicircular canals that when this false rotational sensation is felt objects before the eyes appear to be rushing past at the same rate of speed, though sing past at the same rate of speed, though stationary. This continues and diminishes to the vanishing point only when the motion of the lymph in the canals and the displaced nerve ends have resumed their position of reach.

If a man be whirled in one plane of rotation rapidly and then illted into a different plane and held motionless, he feels this false rotational sensation, with its accompanying visual effect, but in the latter position. That is, the effect is felt in the plane in which the canals are held that have endured the excitation regardless the first position.

This phenomenon affects the aviator in various ways. In the fast tail spin the lateral canals are in the horizontal plane in the property of t

Another peculiarity of this organ appears in the variations to which it is sulject. Its dependability is affected by worry, illness, or exhaustion.

y of the sound state of the soun

We know that fancy ice skaters, spinning dancers, and other trick performers by practice endure extraordinary gyrations without confusion. Our first acrobatic flyer of note is reported to have been a circus performer before becoming

The writer believed these faculties of vital importance in piloting an aeroplane capable of almost limitless development and training, if it might be conveniently continued to proficiency without apprehension or accident. And that when so developed and trained the student-aviator could be taucht the art of managing a

ship in the sky with the minimum of danger to his instructor and to himself, and the maximum of comfort and dexterity in future flying.

Inventing an apparatus that might provide the student-axiator the rotational possibilities of the plane in the air, and possibilities of the plane in the air, and in the plane in the air, and in the air, and the plane in the air, and the plane in the air, and the plane in the air, and the air and the air

The Ruggles Orientator, Model I, was completed under the auspices of the Naval Consulting Board. It immediately demonstrated the soundness of the inventor's contentions. This was followed by Model 2, and then by Model 3, which has been made standard for the United States Army Air Service.

Army Air Service.

The faculty of orientation varies in individuals quite as much as other faculties.
Also the ability to co-ordinate quickly,
but smoothly, the uniscular actions that
will guide the ship. This is strikingly
demonstrated by the students working in
the Ruggles machine.

The legimer who is confused by the unusual position and who "freezes" or jams his controls, or cannot time his muscular actions to the positions or evolution he tries for, or becomes dizzy after a quick turn, with a little careful attention of the instructor quickly overcomes all these





Harry E. Tudor, Sales Manager, 299 Madison Avenue, New York City

difficulties and improves with surprising rapidity in manoenvering blindfolded through predetermined evolutions. Soon his spatial relationship senses become so accustomed to the unusual positions that the dangerous involuntary, unintelligent the dangerous involuntary, intimelingent muscular movements give place to calm and intelligently directed actions, and the interference of the instructor's dual con-trol is met with intuitive correction. The false turning sensations that follow rapid manoeuvers are interpreted and involuntarily compensated for. The tendency to dizziness diminishes

The direction of men's bodily activities may be compared to the navigation of a steamship. The commander decides upon the course, speed, etc., and gives instructions to the Officer of the Watch, who will, in event of unfamiliar danger, consult the Commander for more authorita-tive decision. It is of the utmost importive decision. It is of the utmost impor-tance, however, that he be a thorough seaman, for when a trusted lookout calls warning of a danger so imminent that the Commander may not be consulted disaster is averted by his soundness of

usaster is averted by his soundness or judgment and immediate action.

Man's voluntary (reasoning) brain is the commander of the body. The involuntary brain is the "officer of the watch"-that takes charge while the comwater — that takes charge while the com-mander is otherwise occupied. The most favored lookout is the always active static labyrinth. To the man who pilots an aeroplane it is of supreme importance that this combination of officer and "look-out" be trained to a calm and correct appreciation of as many situations as possible.

The Ruggles Orientator, calling into action some of the most vital functions of

life, with its many special attachments, affords opportunities to the otologist, the physiologist, and the psychologist, and also to the merely practical student-aviators

(Continued from page 781)

(Continued from page 781)
The following named officers will proceed to Rockwell Frield, San Diego, Cal., and report in person to the commanding officer for assignment to duty with the 2d Aren Squadron. First Marty, John Blancy, William E. Oissen, Jr., First Levit. Stdney P. Le Boutiller, Second Lieuts. Carlets McK. Robinson, Hjalmar F. Carlson, John J. Curtis, Jerry L. Bennett, Elbert W. Franklin, Raymond P. Birdsall.

The following-named officers will proceed to Hazelburst Field, Mincols, Long Island, N. Y., and report for assignment to duty with the 3d patrick, Second Lieuts, Mark R. Woodward, Philip H. Downer, First Lieut, Clarence L. Mid-cap, Second Lieuts, Kenneth Garrett, William C. Marwell, First Lieut, Leo Fred Post.

The following named officers will proceed to Wichita Falls, Tex., Call Field: Second Lieuts. Robert T. Gallagher, William B. Atwell.

The following-named officers will proceed to Detroit, Mich., reporting upon arrival to the commanding officer Avastion General Supply Depot for discharge under the provisions of Greular No. 75, War Department, 1918: Capt. William F. Long, First Lieut. Roaster H, Kel-logg, Second Leut. Robert H. Carson.

Major George E. Lovell, Jr., Air Service, is detailed as a member of a board of officers appointed in paragraph 83, Special Orders, No. 135-0, June 10, 1919, War Department, vice Major Albert D. Smith, Air Service, hereby relieved.

First Lieut. George M. Palmer will proceed from Ellington Field, Houston, Tex., to the aviation repair depot, Speedway, Indianapolis, Ind.; thence, by aeroplane, to Bolling Field, Anacostia, D. C.: thence, by aeroplane, to Langley Field, Hampion, Va., on temperary duty in connection with the Air Service of the Army, and upon com-

pletion of the duty enjoined will return to his proper station, Ellington Field, Houston, Tex. The purpose of the travel is to fly a Handler Page aeroplane to Langley Field, Hampton, Va., and the stop at Bolling Field is for the purpose

First Lieut Clarence G. McCarn will proceed from Kelly Field, San Antonio, Tex., to Rock-well Field, San Dugo, Cal., and will regu-ujon arrival to the commanding officer for as-signment to duty with the 2d Acro Squadron.

First Licut. James B. Wallace will proceed to Fort Monroe, Va.

By direction of the President, Capt. William E. Scarboro is dropped from the rolls of the Army under the provisions of section 1229, Revised Statutes.

Capt. Frank A. Llewellyn is transferred to liarden City, Long Island, N. Y., and will report to the Air Service depot for duty.

First Lieut. Harry M. Carroll will proceed to Selfreige Field, Mount Clemens, Mich.

The following named officers will proceed to Call Field, Wichita, Tex., and report in person to the commanding officer for duty: Second Lieuts, George Ii. Beverly, Paul II. Prentiss.

Second Lieut. George A. Clark will proceed to Washington and report in person to the Director of Purchase, Storage and Traffic for assignment to duty in the office of the Director of Finance, First Lieut. Clifford G. Sample is announced as on duly requiring him to participate regularly and frequently in aerisl flights from April 30, 1919.

Second Lieut. Rowan A. Greer will proceed to Rockwell Field, San Diego, Cal.

First Lieut. Joseph R. Pearson, Jr., will proceed to Dayton, Ohio, and report in person to the Chief Engineering Division, Air Service, for

Capt. Herbert A. Thorndike will proceed to Washington, D. C., and will report upon arrival to the Director of Air Service.



Vol. 9. No. 17

JULY 7, 1919

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VOL. IX

JOHN F. McMAHON

NEW YORK, JULY 7, 1919

NO. 17

PATHFINDING AEROPLANE TOURISTS WILL VISIT AIRCRAFT FACTORIES

HE Pioneer Aeroplane Tours of the Aerial League of America announced in the last number of Arrial Age are to be preceded by pathfinding tours, the first of which will take the aerial tourists on a visit of the great eastern aircraft factories.

In the first pathfinding tour the aerial tourists will fly to and inspect the following aircraft factories:

They will start from the Atlantic City Airport and fly to Keyport, New Jersey, and visit the plant of the Aero-marine Plane and Motor Company at Keyport.

From Keyport they will fly to the Roosevelt Field at Garden City, Long Island, where they may stay overnight and visit the plant of the Curtiss Aeroplane and Motor Corporation at Garden City the following morning.

Then they will fly to New Brunswick, New Jersey, where they will visit the Wright Martin Aircraft Corporation, the makers of the famous Hispano-Suiza motors. Next they may stop at Trenton and visit the Roebling

plants, which make, among other things, the wire, cables, and other metal products used in the construction of aeroplanes. They will then fly to Philadelphia and may wist the Naval Aircraft Factory as well as the Unit Construction Company. Time permitting the tourists will also visit the Heas-Bright Manufacturing Company, The Carlson-Wenstron Company, The Committee in Charge of arranging he Pathinding Aeroplane Tours includes: Major Reed, G. Landis, second ranking American Ace. Capstain Charles J. Gildden, John P. Davis, Major Redonds B. Sutton, veteran U. S. Army, Avia-Joseph A. Steinmetz, president Aero Club of Pennsylvanis; Albert T. Bell, president Atlantic City Aero Club; G. Douglas Wardrop, and Major Harry Bubb.

In the pathinding tours to follow, the tourists will visit the aircraft Lactories at Inbace, Rochester, Buffalo, Eric, Cleredon, Carlotto, Charles, and Other Cities.

\$65,000,000 TO BE APPROPRIATED FOR ARMY AND NAVY AERONAUTICS

THE House and Senate have approved the conference re ports on the army and navy appropriation bills, which save the army air service from disintegration and enable the navy to embark on its plans for development of a lighter-than-air programme as already outlined by Secretary Daniels. than-air programme as afready outlined by Secretary Daniels. The conferees agreed upon giving army avaints \$40,000.00, instead of the \$15,000,000 originally appropriated by the House, and \$25,000,000 for moral avaints instead of the \$15,000,000 and \$25,000,000 for moral avaints instead of the \$15,000,000 because the \$15,000,000 sected by the \$15,000,000 Secretary of the Navy. Definite indication of the navy's intention to embark at one on an extensive experimental and building programme with lighter-than-air craft is indicated in the itemused statement of the second s

naval appropriation allowances.

The largest single item is that of \$6,700,000 for continuing experiments and development work for all types of aircraft. In line with this appropriation are \$3,700,000 for construction of two large dirigible hangars on government land, \$1,500,000 for construction of a dirigible, \$2,500,000 for purchase abroad of a dirigible of the latest type, \$500,00 for conversion of the collier Jupiter, sister ship of the missing Cyclops, into an aeroplane carrier, \$100,000 for purchase abroad of five special type 'planes and \$700,000 for conversion of two merchant vessels into aircraft tenders.
In addition, \$3,027,250 is allowed for fleet aircraft purposes;

\$3,008,007 for maintenance and operation of an aircraft factory, helium plant and aircraft stations,

ALLIES' CONVENTION OUTLINES AERIAL NAVIGATION RULES

An international convention setting forth the medical requirements for aerial navigation as adopted by the Paris was made public in Washington. Although this international convention was adopted at Paris on April 12 and was sent to Washington several weeks ago, it was to be kept consent to Washington several weeks ago, it was to be kept consent to Washington several weeks ago, it was to be kept consent to Washington several weeks ago, it was a the minimum age for air pilots and navigators, stipuliest charter and medical requirements, and provides that N international convention setting forth the medical relates physical and medical requirements, and provides that every candidate before obtaining a license as pilot must present himself for examination.

The requirements set forth in the convention are minimal.

Each State may change the conditions, as it deems fit, but these minimum requirements should be maintained, in the opinion

of those who signed the convention on behalf of the five principal allied powers, the United States, Great Britain, France, Italy and Japan. Here is the text of the international agreement:

"International medical requirements for aerial navigation. "I. Every candidate before obtaining a license as a pilot, navigator, or engineer of aircraft engaged in public transport will present himself for examination by specially qualified men (flight surgeons) appointed by or acting under the au-

thority of the contracting State.

"2. Medical supervision, both for the selection and the maintenance of efficiency, shall be based on the following require-ments of mental and physical fitness: "(a) Good family and personal history, with particular reference to nervous stability. Absence of any mental moral or physical defect which will interfere with flying efficiency,

"(b) Minimum age for pilots and navigators engaged in public transport shall be nineteen (19) years.

"(c) General surgical examination: The aeronaut must neither suffer from any wound, injury or operation nor pos-sess any abnormality, congenital or otherwise, which will in-terfere with the efficient and safe haudling of aircraft.

"(d) General medical examination. The aeronaut must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of aireraft. He must possess heart, lungs, kidneys, and nervous system capable of withstanding the effects of altitude and also

the effects of prolonged flight.

"(e) Eye examination: The aeronant must possess a degree of visual acuity compatible with the efficient performance of No pilot or navigator shall have more than two (2) dioptres of latent hypermetropia; muscle balance must be good and commensurate with the refraction. He must have a good field of vision in each eye and must possess normal color perception.

"(f) Ear examination: The middle ear must be healthy. The aeronaut must possess a degree of auditory acmity compatible with the efficient performance of his duties.

"(g) The vestibular mechanism must be intact and neither

under hypersensitive nor hyposensitive.

"(h) Nose and throat examination: The aeronaut must pos-sess free nasal air entry on either side and not suffer from

serious acute or chronic affections of the upper respirators

tract.

"3. Each contracting State shall for the present fix its own methods of examination until the details of the tests and the minimal standard of requirements have been finally scribed by the autority of the state of the

cate of acceptance which must be produced before the license

can be issued.

"5. In order to insure maintenance of efficiency every aeronative to insure maintenance of efficiency every aero-native shall be re-examined periodically, at least every six months, and the findings attached to his original record. In case of illness or accident, also, an aeronaut shall be re-examined and promounced fit before resuming aerial duties. The date and result of each re-examination shall be recorded on the aeronant's flying certificate, "6. No aeronaut who, before the date of the present con-

vention, has given proof of his flying ability, shall, so long as he retains such ability, be necessarily disqualified because

as he retains such about, he necessarily disquanted necessarily fulfill all of the above requirements.

7. Each contracting State may raise the conditions see fourth above, as it deems ft, but these minimal requirements shall be maintained internationally.

Signed by the representatives on helialf of

"United States: Isaac H. Jones, James B. Stanford, "Great Britain: Martin Flack, A. P. Bowdler.

"France: George Cuillain, Jules Levaire.
"Italy: Lieut Col, Guideni, signing for Di Nola and Mattoli.

"Japan: K. Miura. "Paris, April 12, 1919."

WHAT NEXT?

WHAT does there remain for aeroplanes to do now that the Atlantic has been crossed? was the question asked of the representatives of different countries assembled at the Atlantic City airport to witness the tests of the British Guardian Angled parachute. Thereupon they practi-cally resolved themselves into a committee for the discussion of the future of aeronantics, and what was forecast would make Kipling and Jules Verne annear conservative some of whom are very old-timers in aeronautics, cluded Capt. Pierre Bosc, member of the French High Mis-sion, who served in the French Air Service since the begin sion, who served in the French Air Service since the begin ning of the war; Capt, Carlo Tappi, acting Italian Air Attache, who has been in the Italian Air Service since 1911, when he was one of the Italian aviators who fought the Turks o-African soil; Major Orde Lees, who has been in the British Air Force for a number of years: Henry Woodhouse, vice-president of the Aerial League of America, who has been foremost in fostering the development of aeronautics for the past ten years; Earle L, Ovington, the veteran American av-ator, who mude the first aerial mail experiment in 1911. Albert T, Hell and Harry B, Cook, of the Aero Club of Atlan-tic City, who organized the meet in 1910 a which Glein H C Curiss and some of the other early aviators flew, and where the then marrelloss altitude record of 5,000 feet was made. Now the altitude record is 3,000 feet; also A. S. Abell, 3rd, of Baltimors, who participated in the flying events held in that city in 1919; Joseph A. Steinmeta, who has been presi-dent of the Aero Club of Peronyl-brain for the past six years. past ten years; Earle L. Ovington, the veteran American av-Eddie Stinson, the veteran aviator, and others

After witnessing the convincing tests and demonstrations of the remarkable "Guardian Angel" parachute aerial life preserver at the Atlantic City airport, the experts, as usual, cathered at the beautiful home of the Abell family on the Boulevard, near the airport, which has been named "Pilots' Port and Aeronautic Arcadia," and there discussed the future of aeronautics from every standpoint.

Captain Bosc told of stupendons flights made by French aviators across the African deserts, across the Mediterranean sea and across the Great Atlas Mountains; Captain Tappi told of flights made by Italian aviators in Africa, and of aero plane passenger-earrying lines across the Apennine Moun-tais; Major Orde Lees told of flights of British aviators from London to Africa and to India, and of plans to establish aerial transportation lines throughout the British Empire Henry Woodhouse, vice-president of the Aerial League of

America, summarized the things that still remain to be done by aeroplanes as follows: The magnificent flights of the American and British avi-

ators have just opened the tremendous possibilities for aerial achievements.

"Here are a few of the things still to be done: "(1) Cross the Atlantic by direct flights from the United States to England, France and Italy,

"(2) Carry one thousand pounds of mail in a non-stop direct flight from the United States to England, thereby demonstrating the utilitarian value of trans-Atlantic air lines.

"(3) Make a non-stop flight from New York to San Francisco first, then carry a thousand pounds of mail or passen-

gers on subsequent flights. "(4) Fry from New York to San Francisco within one

day's daylight. (5) Cross the North Pole from Cape Columbia to Cape Chelyuskin, as proposed and planned by Capt. Robert A. Bart-

"(6) Fly to Hawaii,

"(7) Fly to the Philippines "(8) Fly across the Pacific.

"(9) Complete the aerial conquest of the Atlantic by flying it by each of the following routes:

"(a) By way of the Azores, then to Madeira, then to either Spain or Africa;

"(h) From South America to Barbadoes and across to the

Canaries: (c) From Cape Orange to Cape Verde and then to the African coast:

"(d) From Pernambuco to St. Paul Island, then either to Cape Verde or straight to the Airican coast:

"(e) By way of Greenland and Iceland to the Faroe Islands and from there to England.

"(10) Fly to Australia and New Zealand.

"(11) Fly across Alaska and demonstrate how aerial transportation will help that rich country.

"(12) Fly from the United States to Brazil and Argentine, and also from the United States to Chili and Peru and other Latin-American countries, and show the marvellous possibilities of aerial transportation in South and Central America.

"(13) A great many high mountains still remain to be cononered by air.

"(14) The deserts still are to see the permanent air lines which will make travel pleasant even across deserts.

"I could go on quoting at least fifty more things which should be done, but these give a good idea of what remains to led done ly aircraft. As I have said, the splendid achievements of Commander Read and his gallant crew, and of Capatin Alcock and Lieutenant Brown, have only just opened the possibilities for real achievements in aeronautics and for making aircraft useful to the world,"



THE NEWS OF THE WEEK



Iceland Establishing Air Service to U.S.

Washington, D. C. According to othcial advice, Iceland intends to establish a regular air service between Reykjavik, its capital, and the Eastern ports of the United States.

P. A. Olafson, consul at Reykjavík, is quoted as saying that two hydro-aero-planes, with sufficient power to accomplish a trans-Atlantic flight, are already in commission, and that a large aeroplane cor-poration has been formed to bring about regular aerial voyages between Iceland and the United States. The present two hydro-aeroplanes will be "tried out" in the circumnavigation of Iceland.

The American-bound plane will "take off" at Reykjavik and fly about 500 nautical miles to the southern tip of Greenland, where facilities will be provided to refuel and repair any damages. The next stretch will be approximately the same distance, from Greenland to Newfoundland, and thence to the United States The same route will be taken on the return trip.

Atlantic City-Long Island Record Again Broken by Sopwith Camel

Atlantic City. N. J.—Another flying record was established on June 28, when Lieut, Kenneth M. Murray, in a Sopwith camel, flew here from Mineola, L. I., camet, new nere troin Mineota, L. I., in fifty-one minutes. Lieut. Murray left Mineola at four minutes past twelve oclock and landed at five minutes before one. He clipped ten minutes off his flight of June 24 from here to the Long Island field. The flyer was congratulated Island held. The flyer was congratulated on his arrival at the Airport by officials and a large number of spectators. Lieut. Murray fought through a north-east storm and a fifty-mile gale.

Worcester Landing Field Being Selected

Worcester, Mass.-Realizing the impor-tance of establishing adequate aerial landing facilities along the New York-Boston air route, Mr. J. Walter Flagg and other interested business men have been deciding on the most suitable tract in or near Worcester which can be made into a firstclass landing field in accordance with Government specifications, Airmen who have flown over Worcester regard it as an excellent locality for a landing place, there being a marked absence of rough air and

Two sites are under favorable consideration, one on Brattle Street, a part of the A. S. Lowell estate, the other on Newton Hill.

Lieut. Quick in SVA Scout to Bring Wil-lard-Dempsey Photos for New York Paper

The practical value of the aeroplane The practical value of the aeropiane will be subjected to a good test in connection with the Willard-Dempsey fight, for the New York World has arranged to despatch a fast machine from Toledo, immediately on conclusion of the fight, with photographs of the event designed for publication in the II'orld on the following morning.

The machine is an Italian SVA, one of the fastest types yet designed, one which did noteworthy service during the war. The pilot of the SVA will be Lieut. Ray-mond B. Quick, who saw much service with the 95th Pursnit Squadron (Ameri-

can) in France.
The SVA will leave Toledo immediately after the fight. If its flight is successful, the pictures of the fight will be in the

papers the next morning.

The ordinary time of delivering these photographs in New York by train would about fifteen hours; by aeroplane it should be about five.

Prince of Wales to Be Starter for To-ronto-New York Aerial Race

Toronto.-An international aerial race. which will start simultaneously from To-ronto and New York, will be held on August 25, with the Prince of Wales as he starter, it was announced here recently. Stops will be made at Buffalo, Syra-cuse and Albany.

A prize of \$5,000 and a trophy have seen offered by John M. Bowman of New York. It is expected there will be more than two-score entries,

Handley-Page Bomber Flies From Indian-apolis to Washington, 505 Miles, In 285 Minutes

Washington A Handley-Page bombing plane, carrying two pilots and five mechanics, on June 24 covered the 505 miles between Indianapolis and Washington in 285 minutes. The pilots were Lieuts G. M. Palmer and G. L. Bradford. No stops were made. Rain fell almost continuously throughout the flight, but did not retard speed measurably.

Huge Aerial Stunting Exhibition at Ne York Police Field Day

Frederick A. Wallis, Deputy Police Commissioner, announced that the greatest flying exhibition ever witnessed in this country will be held on the afternoons of the police field days, to be held at Sheepshead Bay Speedway Saturday, July 19, and Saturday, July 26.

Mr. Wallis said that fifty-six aeroplanes

participated in the army games last August, but that he expected Colonel Miller will have a far greater number par-ticipate in the police aerial exhibition, as there are more than twice that num-ber of aeroplanes available at the aviation fields on Long Island.

Kansas City-Fort Worth Air Line to Open July 4th

Kausas City, Mo.—The first regular aeroplane passenger service out of Kausas City will be to Fort Worth, Tex., with stops at Coffeyille, Kan., and Tulsa, Oklahoma City and Ardmore, Okla. Charles Ora, local manager of the Commercial Airiship Syndicate, of Fort

Worth, stated a small dirigible would make the trip in July. It is hoped to have everything in readiness for the pilot

Mr. Ora said his company had ordered a "sport blimp" dirigible from the Good-year Tire and Rubber Company. The July trip will be for the purpose of completing arrangements at stations for landing facilities.



The "Airco 16", a remedelled de Havilland with a salon for 4 passengers. shows a lady passenger about to enter

R-34 Rapidly Overhauled After 2,000-Mile Baltic Flight East Fortune, Scotland.—The overhaul-ing of the great British dirigible R-34, in preparation for a flight across the Atlan-tic, has been so rapid that she is ready to start as soon as ordered to do so.

weather, however, continues unsettled. It has been necessary to install one new motor and overhaul four others, and to motor and overnaut four oners, and to do considerable work on the huge en-velope, since the rough trip of approxi-mately 2,000 miles the R-34 made over the Baltic. This work has been pushed as rapidly as possible, so that there may be no further delay in making the attempt to cross the Atlantic.

Hardley-Page Still Waiting for Weather Harbor Grace, N. F.—The Handley-Page trans-Atlantic expedition has entered on the third week of waiting for weather conditions that will make possible a start on the projected flight from Newfoundland to England. When that time may come is more uncertain than

ever.
With the abrupt and unexpected changes that have come during the last few days, the aviators have added actual worry to their vevation over the delay. The time their vexation over the delay. The time is really not far distant when the machine will become physically unfit for its intended task, and the resources of the plant here are such that restoration might prove impossible. In that event, there would be nothing to do but to dismantle and send the huge craft ingloriously back to England by steamship.

Had work been continued on the big

portable hangar brought here, it would now be serving a valuable purpose. The hangar, which had been half erected, is, however, merely a jumble of scattered parts, awaiting shipment to Toronto, and the biplane is exposed to the weather, with no protection except tarpaulin covers for the engines and propellers.

for the engines and propelers. The Martinsyde plane is entirely rebuilt and has been under test. Lieutenant Biddlecombe, Captain Raynham's navigator, has been at St. John's for over a week and assisting in the preparations for the attempt to lower the Vickers-Vimy speed record.

Dallas-Boston Flight Record Washington, D. C.—The Dallas-Boston flight, which was completed on June 23 by the seven De Havilands which left Dallas on May 15, made the following flying schedule, which does not, of course, include the exhibition flights made in the interest of recruiting at the stopping places:



Valspar delivered to Allentown by aeroplane

m

From	To Miles	Mi
Dallas	Oklahoma 208	10
Oklahoma	Camp Funston. 300	17
Camp Funston	Topeka 60	4
Topeka	Kansas City 67	
Kansas City	St. Joseph & re-	
	turn 80	1 7
Kansas City	Belleville 285	20
Belleville	Indianapolis 210	14
Indianapolis	Chicago 165	10
Chicago	Milwaukee 80	
Milwaukee	Minneapolis 300	
Minneapolis	Milwaukee 375	
Milwaukee	Indianapolis 260	
Indianapolis	Dayton 110	
Dayton	Cleveland 200	
Cleveland	Buffalo 185	
Buffalo	Albany 260	
Albany	Boston 130	
	Total 3276	200

The average speed for the entire flight is 93.96 miles per hour. The following is 93,96 miles per hour. The following officers and men participated in the flight: Commanding, Col. II. B. Claggett; Pilota, Major J. W. Simons, Jr. Major Roy, S. Brown, 1st Lieut Jack E. Duke, Jr., 1st Lieut Len; Jl. II. Adams, Aol Lieut John Pulm, 2nd Lieut, Robt. F. Midköff. Observers, Capt. W. H. Chandler, Capi. Her-Fluegel, Setts. 1st. Class Ralph Kratz, Wayne Neville, J. A. Smith, Harry H. Wayne Neville, J. A. Smith, Harry H. Aliman.

Talbot Flies From Dayton to Mineola in Six Hours

J. E. Talbot, Jr., president of the Day-

ton-Wright Aeroplane Company, of Day-ton, Ohio, arrived at Mineola from Day-ton on June 17 in a DeHawiland aeroplane. The time of the flight was five hours and fifty-five minutes. Howard Rhinehart, a civilian, was the pilot.

Guardian Angel Parachute Demonstrated at Dayton

Major T. Ord Lees, who during the war was in charge of parachute development for the Royal Air Force, is going to Mc-Cook Field at Dayton for the purpose of carrying on parachute demonstrations in order that the Engineering Section will be able to take advantage of the work. It may be that after the tests are finished at Dayton the detachment will return to Washington to give demonstrations at Bolling Field. With Major Lees is Lieut. R. A. Cald-well, D. F. C., who jumps from aeroplanes

to demonstrate the adaptability of the parachute. The interesting feature of the party is the presence of Miss Sylvia Boyden, a young lady of twenty, who also jumps from an aeroplane. According to Major Lees, the jumping of this young lady has a wonderful effect on the public ady has a wonderful effect on the public in that when they see a lady land safely they have more confidence in parachutes than when a man descends. Miss Boyden is accompanied by Mrs. A. M. Thomas as chaperone.

The first demonstration of Major Lees' parachutes were given at the Atlantic City Airport.

Forest Patrol Fliers Cover 7,615 Miles in Week

Washington, D. C .- Owing to the exceedingly dry weather prevailing, the balloon school at Arcadia has been main-taining aerial patrol both day and night. During the week ending June 21, the Mather mento, Cal., made twenty-one flights over the National forests, discovering four fires, which were reported to the For-estry Service at Placerville, Cal. The total mileage of the patrol was 3,000, and the patrol pilots were 53 hours in

the air.
The March Field Staff, Allessandro. Cal., made twenty-four trips, occupying thirty-eight hours, covering 2,500 miles. The Rockwell Field Staff, San Diego, Cal., made eight flights in twenty-six hours and twenty-six minutes, covering a distance of 2,115 miles.

a distance of 2,115 mues.

Summary for week ending June 21, not including the balloon observation:

Minutes in the air, 7,046; miles of flight, 7,615; number of flights, 53; number of officers and men participating, 15.



red of 160 miles an hour, is pov red by a 700 H.P. Flat engine, the type which will be used for a trans-Ati

RETURNING NC FLIERS ACCORDED ENTHUSIASTIC WELCOME

REETED down the bay by five seanaval and private water craft, bear-ing their families, official committees, and hundreds of well-wishers, Lieutenant Commander Albert Cushing Read, U. S. N., and the crew of the victorious NC-4, N., and the Grew or the victorious N.-., and the Grew or the victorious N.-., first air machine to cross the Atlantic, returned to New York on the transport Zeppelin. On board the Zeppelin were also Commander John H. Towers of the NC-3 and Lieutenant Commander P. N. L. Bellinger of the N.C. 1 and members of their respective crew. Leaden sleeta the help of the N. L. September 1. a steady downpour interfered with the of the aerial demonstration success planned in their honor, but the enthusiasm of those who braved the elements to welcome the aviators was not lessened. Out-side the piers at the Port of Debarkation, Hoboken, a crowd waited for the appear-ance of the aviators and gave them a send-off as they rode away in automo-

When word was received that the Zep pelin had reached Quarantine, the official boats started down the bay. The sub-marine chaser Herreshoff, carrying the wives and relatives of the returning aviators and the Manhattan with a delegation from the Aero Club of America.

The Manhattan carried men most prominent in aeronautical circles in this city. She also had on board J. F. Towers, brother of the NC commander, and his wife, and Miss Mary Towers, a sister of the commander

the commander.

Others on board were Glenn H. Curtiss,
Alan R. Hawley, Rear Admiral Bradley
A. Fiske, Captain Robert A. Bartlett,
Major S. H. Mapes, Major G. A. Pollock,
Henry Woodhouse, Colonel W. G. Barker, the Canadian ace who has sixty-eight
Germans to his credit: H. Pushae Williams, president of the Queens Chamber
of Commerce; W. W. Mountain, Evan J. David, E. V. Hazelton, H. B. Childs and G. Douglas Wardrop.

The several welcoming committees gave the airmen a noisy greeting.



O luters Wives and children of NC flirs waiting to greet a vistors an landing. Left to right: Mrs. N. C. Richardson, and daughter Margars! Mrs. P. Talbot, Mrs. Waiter Hinton, Mrs. J. C. Monifart, Mrs. Albert C. Read, Mrs. Patrick N. Bellinger, Mrs. Jaha H. Tawars, Mrs. James L. Breese, Jr., and daughter Francis

pelin did not stop in the lower bay, as is usually the custom, but continued up the river with its escort of welcomers. The seaplanes did not continue all the way to

The piers.

As the Zeppelin slipped into Pier 4 at the port of debarkation, a milliary band broke forth into the tune of "Hail, hail, the gang's all here," while the group on the pier cheered the men who were lined along the railing of the top deck. With Commander Towers leading, the fliers

the piers.

walked off the steamship and lined up in single file, the NC-1 men having the place single hie, the N-1 men having the place of honor at the extreme right. Salutes were exchanged between the command-ers and Rear Admiral James H. Glennon, representing Secretary Daniels, following which the latter said: "In the name of the Secretary of the

Navy I welcome you home and congratu-late you upon your splendid achievement which has reflected so much lustre on

(Continued on page 825)



O International Film Service

Lieutennan-Commander A. C. Read and his crew, Lieut. E. F. Stope, Lieut. Walter Histon, Ensign Rodol, Cisiel Mechanic E. R. Rhoedes, Lieut. J. L. Bresses, accempanted by Commander Jahn H. Towers, Lieut. Commander Bullieger, Easign Henry Salver, Merchanic E. R. Rhoedes, Lieut. J. L. Bresses, accempanted by Commander Jahn H. Towers, Lieut. Commander Bullieger, Easign Henry Salver, being greated Alan R. Hawley, Henry Woodhouse, Lieut. David H. McCallough, Colsand Archia Miller, Resr-Admiral Glennen and others upan their return to the United States.



The AIRCRAFT TRADE REVIEW



Wright-Martin Merger Details Revealed

The details of the merger proposal submitted to the stockholders of the Wright-Martin Aircraft Corporation, which provides for virtual absorption of the Wright-Martin Company, with its \$7,-000,000 in cash, by the International Mo-

to Truck Company, are as follows:
Wright-Martin Corporation preferred stockholders will receive in exchange for their stock first preferred stock of the International Corporation having a par value equal to par value and accumulative dividends of Wright-Martin Corporation preferred stock deposited.

Wright-Martin common stockholders shall receive 2.8 shares of second prestockholders ferred stock of a par value of \$100 each and two shares of common stock without par value of International Corporafor each 100 shares of Wright-Martin common stock.

Wright-Martin common stock shall be reduced so that for each 100 shares of common stock there shall be issued twenty-five shares of Wright-Martin stock in addition to the stock of the International Corporation stock to be taken in exchange.

The date to which accumulated divi-dends on the deposited Wright-Martin preferred stock will be paid in Interna-tional first preferred stock will be fixed not earlier than September I, 1919, nor later than the issuance of the new stock. Wrightthe plan is accepted the Martin company will sell to the International Corporation all of its properties at New Brunswick, N. J., with the possible exclusion of certain motors and machinery acquired especially to fill government contracts. Other property will be retained by the Wright-Martin company. This will include its agreement with the Hispano-Suiza company grant-ing license rights in the United States; interest in the cross license agreement of aeroplane patents; Wright patents and Simplex patents; interest in the United States Government war contracts for Hispano-Suiza engines and the lease of the Simplex Service Station in Long Island City with equipment and in-

Dr. Cantu, Caproni's Business Representative, Arrives Here

Dr. G. Cantn, formerly in the Italian Air Service, arrived recently in this conntry, coming from England, where he has been for some time making connections with British concerns in behalf of the Caproni Company,

He will act in the United States as business representative for the noted Italian designer, Mr. G. Caproni, and will be assisted in his work by Captain U. V. d'Annunzio, former chief engineer of the Caproni Company,

Dr. Cantu brought with him very interesting data concerning the new fiveengine passenger triplanes now in production in the Milan plants of the Cap-

roni Company Dr. Cantn has made his headquarters at the Biltmore Hotel, New York City,

Courses in Aeronautical Engineering at the University of California

Berkeley, Cal.-The curriculum in Mehanical Engineering at the University of California will hereafter include a course in Aerodynamics, given in the senior year. An endeavor will be made to pre-sent the fundamental principles underlying the design and construction of the aeroplane, and to trace the application of these in commercial types of recognized

A laboratory is being equipped with an aeroplane, type Curtiss JN-4D, with a vertical and a rotary aeronautical engine, and with miniature wind channels for student use.

The treatment of internal combustion engines is being altered to include the de-sign principles of the aeronautical engine. The course is at present a part of the Mechanical Engineering curriculum and it is the intention to continue it as such for some time to come. The addition of this work broadens the present curriculum for mechanical engineers by including aerial transportation in the general transportation problem.

Champion Spark Plug Salesmen Hold Convention at Toledo

Toledo. Ohio.-The seventh mid-year sales convention of the Champion Spark Plug Company, held in Toledo the week of June 9-15, was a record-breaker in many respects, particularly from an attendance standpoint. Over 125 factory representatives of the big Toledo concern answered present to the roll-call Monday morning, this being the largest gathering of salesmen brought together by a manufacturer of

spark plugs.

The convention program this year included regular husiness sessions every morning and afternoon, at which officials of the company, heads of the different departments and a number of specialists in other lines of business addressed the men on various subjects relating to salesment of Various suspects features of manship. The opening day was devoted to talks by officials of the company, President R. A. Stranshan welcomed the men to Toledo and Sales Manager Caswell spoke on "Selling Without Misreresentation." Robert Martland, secretary California Trades Association, addressed the afternoon session, followed by H. L. Corey, advertising manager, and O. C. Rolide, chief engineer of the Toledo concern. In the evening, special cars were run out to the Toledo Yacht Club, where

dinner was served.

On Tuesday morning the sales force left for Detroit to inspect the Jeffery-Dewitt plant, where the famous 3450 Dewitt plant, where the famous 3450 Champion insulators are produced. A new leer or tunnel kitn over 300 feet long was the chief center of attraction, although every step in the art of making porcelain proved a study in itself. After a luncheon at the Detroit Athletic Club, the delegation of salesmen crossed over the delegation of salesmen crossed over to Windsor, where special cars were waiting to take them out to the site recently purchased by the Champion Spark Plug Company for its Canadian plant. Mayor Winter and a number of plant. Mayor Winter and a number of other Windsor officials were present for the ground-breaking ceremonies, the Mayor turning the first sod. The return trip to Toledo was made by boat, everyone enjoying the five-hour sail down Lake

The rest of the week was devoted largely to business sessions at the Cham-pion Convention Hall. The big banquet of the week was held at the Toledo Club on Thursday evening, the feature of which was the distribution of cash prizes awarded by Mr. Caswell to members of the sales force. Seventy-three prize checks totaling several thousand dollars checks totaling several mousand dollars were given to those who had shown unusual ability during the past year.

Friday and Saturday the men were grouped for special class meetings super-

vised by the territorial managers. urday night saw most of the salesmen

on their way back home.



Salesmen of the Champion Spark Plug Co. assembled at the Sales Convention at Tole to held June 9 to 15



New York-Chicago Aerial Mail Flight Made in Eight Hours

In a trial flight of the New York-Chicago aerial mail route, one of the mail planes on June 25, covered the 745-mile distance between the two cities in eight hours, making stops at Bellefonte Park, Pa. and Cleveland, Ohio.

It is expected that four aeroplanes will he operating regularly between New York and Chicago by July I. The aeroplanes will leave New York for the first lap of the trip each morning at five o'clock, the final aeroplane delivering the mail in Chicago at one o'clock in the afternoon

of the same day.

Although for the present the aeroplanes now in service will be used, the
post office authorities intend to put on much larger machines in the autumn, and expect that the excellent time made vesterday will be bettered.

It is intended that the number of aeroplanes will be materially increased as the need for them and the certainty of the service is established. Army aviators are eligible as pilots for the service, and a limited number will be taken on within a short time.

Bids for Aerial Mail in Colombia Asked By P. O. Department

Tenders are being invited by the Government of Colombia for the conveyance of mails by aeroplane, or airship between Bogota and Barranquilla, between Bogota and Pasto, and between Bogota and Cucuta; on each route there will be several landing points. The contractors will have to be responsible for the mail matter conveyed in their machines, except in cases veyed in their machines, except in Case of fortuitous mishaps, duly proved. A fine up to \$5,000 is to be paid by the contractors should they fail to transport the mails by air. The first contract will be for four years, and may then be renewed from year to year. Tenders have to be sent to the Colombian Postmaster-General by next September, and it is hoped to start the services in June of next year.

John M. Miller, Formerly Naval Aviator, Piloted Aero Mail Plane Through Winter's Worst Storm

John M. Miller, now in the Aerial Mail Service, received his first aeronautic ex-perience at the Burgess Co. of Marbleperience at the Burgess Co. of Marble-head, Mass., and later at the Sturrevant Co. of Boston. He enlisted in the Naval Air Service on May 23, 1917, and was ordered to active duty at the Massachu-setts Institute of Technology Ground School. After two months here Miller received elementary flying instruction at Hampton Roads and advanced instruction



Ensign John Matthew Miller, new piloting De Hevilend biplenes for the Aerial Mail Service

at Pensacola. He was commissioned on March 16 and ordered to the Rockaway Naval Air Service,

Here Miller did patrol and convoy work off New York harbor, acting as division commander for two months, then being advanced to the position of assistant squadron commander, which he continued until ordered to inactive duty on December 15, 1918.

Since entering the postal service he was stationed at Belmont Park for D. H. instruction; then he was ordered to Bustleton as station manager. While stationed here he made a trip from Philadelphia to New York in the worst winter storm re-corded in some years. On May 16 he made his first flight on the Western Divi-sion between Cleveland and Chicago, which was the second flight over that route. On May 22 Miller made the first non-stop flight between Cleveland and Chicago.

Aeroplane Mail Cheaper Than Railway Mail

Washington, D. C .- In explaining the reasons for the forwarding of ordinary mail by means of aeroplanes, the Post Office stated that \$62,000 has been saved over the Chicago-Cleveland route since its inception several weeks ago. The railway mail rates are based on weight and the Post Office Department has found it more economical to employ aerial mail than railway service.

Philadelphia-Atlantic City Aerial Passenger Service Starts

Atlantic City, N. J.—Inaugurating the Philadelphia-Atlantic City Air Service, James S. Clark, Assistant Secretary of the Land Title and Trust Company of Philadelphia, was the first passenger ar-riving at Atlantic City on June 25. Clark the aerial route for the shore to attend the convention of the National Asso-ciation of Real Estate Boards. Frank Mills, head of the flying school

field at Essington, piloted the craft. The pair left Essington at 9:20 June 25, manoeuvered over the Land Title Building in Philadelphia and then went to Atlantic City by way of Cape May, flying against a direct head wind. They arrived at the Curtiss flying field here at 11:30 A. M.

Lincoln Aero Club Establishes Landing Field

Lincoln, Neb,-The Lincoln Aero Club Lincoln, Neb.—The Lincoln Aero Club has opened a landing field on a very level sixty-aere tract, donated to the Club by Mr. Mark Woods of Lincoln. Fences have been erected and parking space for 250 motor cars provided. The citizens of Nebraska have taken

an enthusiastic interest in flying. The passenger bowing once on the left has attracted more business than can be taken care of. Six Curtiss planes have been delivered by the local agency and three more are on order. In this section, as throughout the country, aeroplanes are playing an important part in Fourth of July celebration plans.

Former Army Flier Goes to Commencement By Air

Middlebury, Vt.—Charles S. Jones, of Rutland, left Roosevelt Field, Mineola, L. I., in an aeroplane at ten o'clock on June 19 and landed at the Addison county fair ground here at quarter to five o'clock the next day. Jones, who won the Croix de Guerre while serving as an aviator in France, took this method of coming to atrrance, took tins metrod or coming to at-tend the Middlebury College commence-ment. He was the leading athlete of the class of 1915 at Middlebury. Ralph II. Mann, of Worcester, Mass., on his way to the University of Vermont commencement. accompanied Jones,

LAWSON AERIAL TRANSPORT

The giant Lawson "C.1" biplane was designed from a strictly commercial point of view and is the first of a unimber of the type tow view and is the first of a unimber of the type tow view and San Francisco to be known as the Lawson Air Line.

The fine-fage is built to accommodate 26 passengers and all

The fuschage is built to accommodate 26 passengers and all the details of its construction and performance characteristics take into consideration the safety and comfort of the passengers. In this regard the mentine possesses a high degree specific passenger in the passenger in of constantly working the controls,

The seats are readily detachable and sleeping quarters installed for a fewer number of passengers when cruising for considerable distances.

The general specifications of the Lawson Air Transport

-1" are as follows:
General Dimensions
Span, both planes 85' 0"
Chord, both planes
Gap 9' 3"
Gap 9' 3"
Length overall
Height overall 14' 0"
Areas (sq. ft.)
Main planes, including ailerons
Main planes, including ancions
Ailerons (4)
Stabilizers (2) 172.5
Elevators (2) 57.5
Rudders (3) 52
Angles
Incidence of main planes
Dihedral
Sweepback 6°
Stabilizer setting to wing chord
Weights
Machine fully loaded
Performances
Climb in 10 minutes with full load 4.000 ft.
Ceiling 15,000 ft.
Gliding angle 1 to 8
Fuel duration
Flight duration 500 miles
Main Planes

U. S. A. 5 wing section is used. Main planes are in seven sections. The outer center section extends between the outer sections. struts of either engine nacelle. The two lower center sections run from the suschage to outer engine nacelle struts.

run from the tuselage to outer engine nacele struts. Wings have a factor of safety of 14, which is rather high when it is considered that usually the safety factor is 8. The wings are strongly braced internally and externally by cables which are double in every case. Wing struts are of wood.

Seats are placed at windows at each side of the body, and an aisle between the seats allows passage from the front and rear of the cabin. On the left side of the cabin forward of the wings an entrance door is provided. This door is of such proportions that the usual method of climbing or crawling into the machine is done away with.

into the machine is done away with.

To enter or leave the machine one of the pilots 'seats to
To enter or leave the machine one of which construction
upholstered with green leather. They are secured to the floor
and provided with safety belts. The interior is finished in
mahogany. The floors are covered with carpet. The depth
of the body allows one to stand up without stooping when

walking through.

The forward part of the body is covered with veneer and the rear of the cabin section is covered with fabric. Intermally, both veneer panel struts and wiring is used for bracing.

All cables are hidden from view. Longerons are of solid section ash on their forward ends, and spruce in the rear.

Costrols

Dual controls are provided at the forward end of the cabin. Control wheels are 18" in diameter and are mounted on a tube extending from one side of the body to the other. The wheels control the ailerons and elevators, and the usual foot bar is used for the rudders. All control surfaces are inter-connected and cables doubled.

In the ailerons wood is used in the construction. For the stabilizers and elevators both wood and steel are used. The rudders are nearly all steel. For night flying, electric lights are supplied for the instrument board, interior of the cabin, and the wings.

The fuselage terminates in a steel tube stern post to which is attached a rear spar of the lower tail plane and also tail skid. The tail, of the biplane type, is adjustable to counteract any differences in balancing which may ensue. Due to the large size of the machine, passengers may move freely about

the tisselage without any disturbance to plane. Nunders and elevators are of the balanced type.

The landing gear is composed of two pairs of 36" by 6" wheels carried on large streamlined steel tube struts. They are attached under each engine in such a way as to evenly take up the landing shocks with a minimum of strain to the

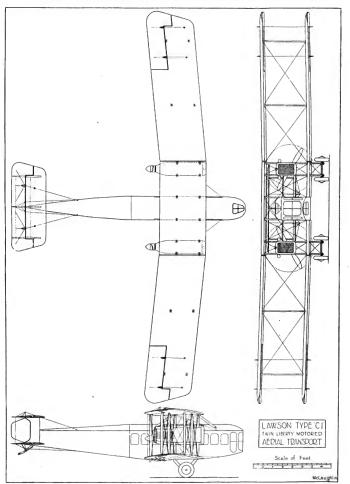
wings and fuselage.

Two 12-cylinder Liberty engines are used. They are com-pletely enclosed in nacelles at either side of the fuselage. Front ends of nacelles are formed by the radiators. Engines Front ends of naccues are formed by the radiators. Engines are placed in pusher position with propellers 10° in diameter revolving in opposite directions. They rest on large ash beds internally braced by steel tubes. Gas tanks are located in the nacelles. Engines are equipped with separate controls to the pilot's compartment, where they may be operated separately

or together. Effective mufflers are provided which add greatly to the comfort of the passengers,



The fuselage of the Lawson Aerial Transport is 45 ft. long, 7 ft. high and 4 ft. 9 in. wide. Previsions are made for seating 26 pass Two 400 H.P. Liberty motors are used



THE SPERRY PARACHUTE

By H. E. GOODMAN

A GREAT deal of interest has been aroused by my recent demonstration at the Atlantic City Airport of the Sperry parachute, and readers may find it interesting to know the details of the chute and of its operation.

The diameter of the chute is 23 feet. The descent is made at the rate of about eight miles an hour, which is the equivalent of jumping from a height of about twelve feet. The reason for the small size of the parachute is, strange as it may seem, safety. The larger the chute the greater the strain at the point of opening for a given speed, and when you cut



Harness of the Sperry Salvo Parachute

loose from a high-speed ship a large diameter makes neces-100se from a mgn-speed snip a large diameter makes neces-sary a heavier harness and connections to the parachute as well as stronger fabric throughout. When it is realized that when a jump is made the strain is around 1,200 pounds on my harness it will be appreciated that to increase this strain ma-terially would cause discomfort and the opening would be

In coming down, I climb out of my harness, stauding with one foot in the bottom loop and hanging on to the rope with one hand so that just before touching the ground I can swing free and therefore alight more easily than would be the case if the harness and chitte were attached. Should there he a strong wind the parachute would he liable to drag me. Another advantage in this is that the parachute deflates the moment there is no weight attached to it.

An advantage in Sperry's design is that the aeronaut is able to get out of the machine when it is in an abnormal position, to get out of the macnine when it is in an antiferring position, such as in a tall spin, on its back, or on one side. This cannot be done with a clute of the type installed under the fuselage, for should the machine be on its back when the jump is made the clute would be dragged over the fuselage, which would be daugerous. With that type also the jumper can get out of only one side of the aeroplane, so that should a wing come off, and he wished to jump from the opposite side of the plane, he could not do so.

A good feature of the custion type of parachute is that it takes up no extra space in the cockpit, as it simply replaces the regular cushion of the seat. Space in the cockpit is a much needed thing, and besides when you are sitting on the chute you know it is not going 10 dangle out and get into trouble. I believe the cushion type is most satisfactory, be-cause when I get out of the plane it is my whole weight that is jerking the parachute out of the container, whereas in the pack type it is only the strength of the break cord at the peak that icrks the wad of silk out,

The Sperry clinte is arranged with a pig tail of twenty feet which can be attached to the aeroplane. It opens in from one to one and one-half seconds, but should you desire a delayed to one and one-mail seconds, but should you desire a delayed opening you can get this, not by attaching the rope, but by or release, whereupon the air resistance will jerk the pack open. I used this delayed opening system in getting out of Stinson's plane when it was on its lack, because I was afraid that Stinson might come out of his npside-down glide and strike me, because he, of course, always winds up the upside-down glide going in the opposite direction from the direction he goes when I leave the plane. Therefore, I preferred the

delayed opening on that occasion, even though it seemed to

orry some of the spectators on the ground.
With the type of chute that goes under the fuselage there with the type of chute that goes under the fusetage there is danger, especially in high-speed aeroplanes, of the air carrying the parachute into the tail skid, which does not occur in the cushion type, as the jumper is some distance from the aeroplane before the extension occurs.

In the demonstration, made of the Sperry Salvo Chute or

life-preserver, several distinctive features were brought out: 1. That only five seconds' time is required to make the in-

stallation in any plane.

2. The jump can be made from either side of the plane. 3. The jump can be made while machine is flying upside

down. 4. There is no difficulty in leaving the plane while in a tail

spin 5. The parachute, not being affected by the high rate of speed in such a way as to become entangled in any part of the aeroplane, it is possible to make the jump during a nose

dive 6. The weight of the entire life preserver equipment is in

the neighborhood of 12 pounds. 7. The chute is very compact. It takes the place of the ordinary cushion in the aeroplane and is but slightly larger than such a cushion, thereby not requiring room that is not already available.

8. The harness is remarkable in its lightness (15/2 pounds, total weight). It does not interfere with the aviator flying his machine and there is no likelihood of slipping out of the harness at the time that the chute opens. Due to its design, it can be worn by women with special costumes as well as



The compact arrangement of the Sperry parachute, which is used as a seat cushion

men. Its application of strain to the user is in such a way that the minimum tax results.

The device has a safety factor of 40. The harness is tested

Into device that sarety Jactor of w. Internations to rever up to 4,000 pen and active Jactor of the Alfantic Cly Airport special demonstrations of the Art the Alfantic Cly Airport special demonstrations of the sparsety parachite were made before the Contest Committee on parachitets of the Aero Club of America. It was brought our hat the above-mentioned points were achieved without resort to complicated mechanism. The simple method employed to the advantage of the Aero method of getting away from the advantage of the Aero method of getting away from the slip stream of the aeroplane can be regarded as getting away from any proximity to the plane at the instant the

parachute starts to extend.
In regard to the development of parachutes, I might take advantage of this opportunity to mention that Naval Con-structor Hunsacker, who is in charge of the Aviation Sec-tion of the Bureau of Construction and Repair, has a paration of the foreau of Construction and Repair, has a parachite division in his Bureau. We consider that this division has advanced the art of parachutes for both lighter and heavier-than-air aircraft beyond any other development in this line either here or abread.

THE GENERAL PROPERTIES AND USES OF PLYWOOD

By B. C. BOULTON, B.S., A.E.

PART II

(Continued from page 727)

Plywood Strength Tables

THE very large amount of data available on the strength and other properties of all the common varieties of wood I will other properties of an the common warriest of two on when make up into plywood panels of varying thickness, make the properties of the properties of the combinations of species, has been collected and summarized in several tables which are reproduced herewith. The woods used in the tests from which these tables were calculated came from various parts of the country, so that slight variations are constructed to the contract of the country of the country is the slight variations.

from various parts of the country, so that singht variations due to locality are eliminated. Column Tests: Tests to determine the column bending modulius were made on specimens 5×12 in. in size. In order that the panel could be computed as a round-ended column, its ends were rounded into a semicircle. The modulius is calculated by the formula $S = P/A + 6M/\rho d_f$, in which $S = P/A + 6M/\rho d_f$, in which

A = Gross area of cross section.

= Load at maximum moment. M = Maximum bending moment.

= l'x maximum deflection. h = Width of test piece. = Thickness of test piece

Like the modulus of rupture in the ordinary bending test, the column bending modulus is not a true stress existing in the fibres at the instant of failure, because the elastic limit has been exceeded, but is rather a measure of the comparative strength of plywood in resisting external bending moments. This property includes two factors, a compressive stress and a bending stress, but the former is relatively so small that the column bending modulus can be used and treated as the modulus of rupture.



In connection with the unit column loading, or P/A factor in a column test, a series of experiments were made on plyiii a column test, a series of experiments were made on plywood of various thicknesses to determine whether for a given slenderness ratio the length of a plywood column had any slenderness reaches the region. It was found that the length of the problem strength. It was found that the length of the length of the column to its least radius of gyrataio of the length of the column to its least radius of gyrataio. Fig. 3 shows a plywood column ready for this test. Relative Splitting Resistance: In column 13 of table 1 is given the relative splitting resistance of various types of plywood, as measured by the amount of work required to split a 5 in square test panel in the apparatus librarated in Fig. 7.

a 5 in, square test panel in the apparatus illustrated in Fig. 7. This testing device consists essentially of a sharp pointed plummet or weight that can be dropped from a given height enhelded slightly in the center of the panel; the weight is then raised to a certain height and dropped. This procedure is repeated until final failure occurs. The amount of work done is the product of the weight of the plummet and the total distance durough which it has fallen.

As has been previously noted, resistance to splitting is of importance, principally in connection with the fastening of phywood along its edges by means of screws, nails or bolts. Incidentally, it is important to add that tests have demogrant

incudentally, it is important to alou that tests have demonstrated the great superiority of screws over any form of mals, a screw being more effective than a nail twice its length. It will be noticed in table 1 that the splitting resistance of the various species is expressed as a percentage of that of velow birch. In all the plywood test, this wood has been taken as a standard, and in table 3 certain properties of other species are also expressed as percentages of the corresponding species are also expressed as percentages of the corresponding properties of yellow birch.

properties of yellow birch.

Table 4 gives the result of tests made to determine the
Table 4 gives the result of tests made to determine the
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t wood that will have the same weight as a unit thickness of yellow birch veneer, information of considerable interest to designers. It should be noted that in this table only the relative densities of the woods themselves were considered in tive densities of the woods themselves were considered in computing the thickness factor, and not the densities of the amount of glue that different species of wood will absorb. This, as a rule, is greater for open-grained woods than for leavy, dense woods, such as maple and birch. The thickness of any panel that shall have the same strength in bending as a yellow birch panel can be calculated from the thickness fac-tors found in column 6 of table 3. These factors were obtained as follows:

$$M_1 = \frac{S_1 b d^2_1}{6} = M_2 = \frac{S_1 b d^2_2}{6} \therefore d_1 = d_1 \sqrt{\frac{S_1}{S_2}}$$

If d₁ is taken as unity, S₁, the strength of yellow birch in bending, as 100, and S₂ as a percentage of S₁, the thickness

factor,
$$K_s = \sqrt{\frac{100}{S_2}}$$
, and $d_2 = d_1 K_s$. It should be emphasized

that the ratio of core to total thickness must be same for both the birch panel and the one for which the calculation is being made. Also, differences in the number of plies and in the total thickness of the proposed panel may affect this relation

somewhat.

In table 5 are given the weights in ounces per square foot of different thicknesses of various species of wood used in source foot for a single layer of glue, the total weight of a plywood panel of any thickness, number of pies, or combination of woods can be readily calculated. The results will be as accurate as normal variations in the density of any one species will permit. Here again, however, a slight error is introduced by neglecting variations in the amount of glue absorbed by different woods.

All the tables reproduced in this article were prepared by the Forest Products Laboratory for the Bureau of Aircraft Production. The photographs also were taken in connection with their testing.

TABLE 1 TENTATIVE TABLE OF STRENGTHS OF VARIOUS SPECIES OF 3-PLY PANELS

All plywood was 3 ply with the grain of anceesive plies at right angles.

All plies in any one panel were of the same thickness and of the same species. Eight thicknesses of plywood ranging from 3,307 to 3,60° were tested.

	Av. Sp.	4 0	A C	A C	4 0	4 0		Av.	Ce	dama Ben	ding Mod	Inlus		Tensile :	Strength		Split. R	esistance	Modulus	d Elas'c't
Species	Gravity	percent Mount-	*Pa	rallel	*Perpe	endicular	*P4	rellal	*Perpe	ndicator		Percent	*Parallel	*Perpend						
-petter	Ply- twood	HIE	No. of Tests	Lbs. per	No. of Tests	Lbs. per	No. of Tests	Lbs. per	No. of Tests	Lbs. per	No. of Tests	of Birch resist- ance	Lbs. per sq. in. in Beod's	Lbs. per tq. in. in Bend						
1	3	3	4	5	6	7	8	9	10	11	12	13	14	15						
Birch, Yellow	67	8.5	195	16,000	200	3,200	200	13,200	200	7,700	400	100	2,259,000	197,000						
Ash Black	.48	9.2	NO.	7,360	80	1.620	80	6.200	240	3.940	160	68	1,028,000	87,000						
Ash, Black	-61	10 6	160	9,980	160	2,640	160	6.540	160	4,330	320	72	1,422,000	144,000						
Basswood	41	9.6	160	6.520	160	1.540	160	6.300	160	4.100	320	65	1,213,000	85,000						
	67	8.6	120	15,390	120	2,950	120	13,000	120	7.260	240	76	2,149,000	167,000						
Cadar, Spanish.	.41	13.3	115	6,460	115	1,480	115	5.200	115	3.340	230	60	1,032,000	84,000						
Cherry	49	9.9	40	11,180	40	2,220	40	6,920	40	5,650	80	86	1.448,000	150,000						
Chestnut	4.3	11.7	40	5,160	40	1.110	40	4,430	40	2,000	80	74	744,300	75,000						
Cottonwood	. 48	9.6	40	8,110	40	1,660	40	7,540	40	4,500	80	94	1,461,000							
Douglas Fir.	. 45	8.4	105	8,890	110	1.730	110	5,630	110	3,530	220	59	1,316,000							
Elm, Cork	.59	11.7	35	10.530	35	2.160	35	9.840	35	6.040	70	100	1,729,000							
Elm, White.	53	8.0	120	8.810	120	1.990	120	6,460	120	4,190	240	85	1,230,000							
Jum, Red	. 54	8.5	102	9.330	102	1.830	102	7.780	102	4.890	204	58	1,487,000	107,000						
Gum, Cotton.	49	10.3	80	7,770	80	1,580	80	6.200	80	3,770	160	60	1,300,000	111,000						
Gnm, Black	54	10 6	40	8,090	40	1.920	35	6,960	35	4.320	70	55	1,275,000	113,000						
Hackberry	.54	10.9	40	8,380	40	1,720	40	7.870	40	4,550	80	85	1.257.000	111.000						
Hemlock	49	9.2	40	9,520	40	2,120	40	7,490	40	4,740	80	65	1.614.000							
Maple, Soft	60	9.0	80	11,750	80	2,430	80	8,020	80	5,470	100	114	1.822,000							
Maple, Hard	.68	7.6	K2	15,870	82	3.320	82	11,610	82	7,060	164	124	2.009.000							
Mahogany, True	.48	11.4	35	8.500	35	1.940	35	6,390	35	3,780	104	124	1,252,000							
Mahogany, African	.52	12.7	20	8.070	20	2.000	20	5,370	20	3.770			1,261,000	144,000						
Mahogany, Philippine.	.53	10.7	25	10,160	25	2,310	25	10,670	25	5,990	30	90	1,820,000							
Manogany, Fullippine.	.50	9.9	40	9,830	40	2,340	40	10,000	40	5,740	80	96	1,704,000	109,000						
Magnolia.	. 64	10.1	75	9,440	75	1,920	75	7,260	75	3,950	150	90	1,704,000	135,000						
Dak, White.	. 50	9.3	115	8,500	115	2,070	115	5,480	115	3,610	230	90	1,085,000	106,000						
Oak, Red	. 43	10.2	35	7,920	40	1,770	40	5,640	40	3,870	2.90	52	1,289,000	120,000						
Pine, White	. 50	9.0	120	8,9(K)	120	1,920	110	7,380	120	4,520	240	52								
Poplar, Yellow.			120	8,9(K)	65	1,500	65	1,380	120	4,520	240	52	1,501,000	114,000						
Redwood	. 41	11.2		7,900	80		80	8,100		3,000	130		1,211,000							
ycamore	56	10.0	80	10,920		2,390		8,840	NO	5,480	160	79	1,642,000							
Spruce, Sitka.	41	8.0	63	7,280	63	1,540	63	5,180	63	3,150	126	7.5	1,176,000	98,000						
Walnut, Black.	.58	9.7	80	11,850	90	2,660	NO	7,640	80	5,100	160	77	1,664,000	144,000						

^{*}Parallel and perpendicular refer to the direction of the grain of the faces relative to the direction of the application of the force. Oravity based on oven dry weight and volume at test.

Design of Various Aeroplane Parts of Plywood

Wing Ribs: Tests have demonstrated that for chord lengths up to 75 in., which, with an R. A. F. 15 section, would give a maximum depth of about 4½ in., the type of construction maximum depth of about 4½; iii., the type of constriction which employs spruce can stripes, and a pilywood web, suitably lightened by holes, is fully as efficient and strong as any built-up or trunsed rib, and in addition is more reliable and easier to construct than these types. That there is a limit, however, beyond which the trussed construction is superior to the physood, is obvious, but only more extended experimentation can determine what this limit is. In the webs of mentation can determine what this man 13. In one score plywood ribs two types of cutouts are used, the circular and the elongate; the latter may be oval or often nearly rectangular, with a length two or three times its depth. Since the lar, with a length two of turee times its depth. Since the vertical members of the web serve to carry compression and whole, it is usually best to have the grain of the face piles vertical. This is an illustration of the principle that the grain of the coutside piles should be in the direction of a column load. Furthermore, as a function of the web is to act with the flange or capstrip in carrying both compression and bending, it is best to have the core, in which the grain runs parallel to the capstrip, form a large proportion of the total web. Where low density woods are used in both the faces and core, the ratio of core to total thickness should be about I to 2; and where high density faces are used with a low density core this ratio may increase to 2 to 3. Among the light woods, Spanish cedar has proved most satisfactory for rib construction; while in the heavier species, combinations of yellow birch maple faces with basswood or poplar cores are most suit-le. Within the range of chord lengths which have been tested the following thicknesses have been found to give good results: For Spanish cedar throughout, 1/40 in. faces and 1/16 in. core; for birch outside plies and poplar core, 1/55 in. faces and 1/13 in. core.

Fusclage Skin. Plywood in fuselage construction may be

Fusclaye Skin. Plywood in fuselage construction may be used merely as covering, or as reinforcement for a truss that is designed to carry either the entire load or a large portion of it. Or, if the fuselage is of the all-veneer type, the plywood shell itself, strengthened by the longerons, carries all the load. When plywood is used in conjunction with a fuselage truss

shell itself, strengthened by the longerons, carries an the load. When plywood is used in conjunction with a fueslage truss tendency is more pronounced when the plywood has to lie flat than when it is curved. To decrease wrinking or similar distortion, the core of the plywood is made relatively thick, and of a low density wood like poplar or basswood, while the

face plies are of thin malsogans or birch. In the first application of plawood to include transes it served metely as elemeing to replace linen. Any strengthening it afforded was incidental and was neglected in computing the longerons and wires of the truss. This was of course uneconomical. In laser designs the plawood was made slightly heavier and stresses, to afford lateral support to compression members, and to bind together and sliften the entire truss. It was found

TABLE 2
TENSILE STRENGTH OF PLYWOOD AND VENEER

Species	No. of Tests	Moisture at Test	°Sp. Gravity of plywood	t Tensile Str. of 3-ply wood parallel to grain of faces l.bs. per eq. in.	Tensile Str of tingle ply veneer—15; (d) I.ba. per aq. in.
Birch. Ash, Black Ash, Commercial	(a) 200 80	(b) 8.5 9.1	(c) .67 .57	(d) 13,240 6,200	19,880 9,300
White	120	10.5	.61	6,700	10,050
Rasswood.	160	9.6	.41	6,300	9,450
Beech	120	8.6	.67	13,000	19,500
Cedar, Spaoush	NO	11.8	.43	5,220	7,830
Cherry Chestnut	10 10 10	9.9 11.7 9.5	.49 .43	6,920 4,430 7,540	10,380 6,640 11,310
Douglas Fir.	110	8 4	.45	5,630	8,440
Flm, Cork	35	11 7	59	9,840	14,760
Flm, White	120	8 9	.53	6,460	9,690
Gum, Red	102	8 5	. 54	7,780	11,670
Gum, Cotton	80	10 3	. 49	6,260	9,390
Maple, Soft	80	9 0	. 60	8,030	12,030
Maple, Sugar. Dak, Red Dak, White Poplar, Yellow	115 75 90	7.6 9.3 10.1	.68 .59 .64	11,610 5,480 7,260 7,130	17,420 8,220 10,500 10,690
Redwood	65	t1.2	.41	5,100	7,650
Sycamore	10	10.2	56	9,180	13,770
Spruss, Silka	40	7.9	41	4,900	7,350
Walnut, Black Pine, White Mahogany, Philip-	811	9.7 (0.2	.43	7,640 8,640	11,460 8,460
pine	25	10.7	. 53	10,670	16,000
Mahogany, 1 rne	35	11.4	. 47	6,380	9,370
Mahogany, African	20	12.7	. 52	5,370	8,000

^{*}Specific gravity based on oven dry weight and volume at test.

(Based on total cross sectional area.

(Based on assumption that center ply carries no load.

Data based on tests of three ply penels with all plies in any one pased assume thickness and specific

TABLE 3 THICKNESS FACTORS FOR VENEER Giving: (a) Veneet thickness for same total bending strength as birch. (b) Veneet thickness for same weight as birch.

	G*			S	Ks	Kw
Species	Av. Sp. Gravity of species from Bulletin 556 and other sources.	Specific Gravity of glued plywood as tested.*	Percent Moisture of ply- wood as tested.	Unit bending strength com- pared with bitch average of Cols. 5 and 7, Table 1 in percent of Birch.	Thickness factor for the same total bending struch.	Thickness factor for the same weight as hirch.
t	2	3	4	5	6	7
Birch, Yellow Ash, Black Ash, Commercial	.63 .50	_67 _48	8.5 9.2	100 47	t.00 t.46	t 00 1 26
White	. 58	-61	10.6	66	1.23	1.09
Basswood	. 38	41	9.6	42	1.51	1 66
Beech	.63	67	8.6	96	1 02	1 00
Cedar, Spanish .	.34	41	13 3	41	1.56	1 85
Cherry	51	49	9.9	70	1.19	1 24
Chestnut	44	43	11.7	33	1.74	1 43
Cottonwood	43	48	9.5	51	1.40	1 67
Douglas Fir	41	4.5	8 4	55	1.35	t 43
Elm, Cork	66	59	11.7	68	1.23	95
Elm, White	.51	53	8 9 8 5	56 58	t.33 t.31	1 24
Gum, Red.	52	49		49	1.43	
Gum, Cotton	52	54	10.3	52	1.38	1.21
Hackberry	54	54	10.6	53	1.35	1 17
	42	49	9.2	61	1.28	1.50
Maple, Sofs	48	.60	9.0	74	1.16	t 31
Maple, Hard	62	686	7.6	100	1.00	1 02
Manogany, True	49	414	11.4	54	1.36	1 29
Mahogany, African Mahogany, Philip-	- 66	.52	12.7	53	1.37	1 37
DIDC.	. 57	. 53	10.7	65	1.24	1.11
Magnolia	51	50	9.9	63	1.26	1 24
Dak, White	69	. 64	10.1	59	1 30	91
Dak, Red	-63	59	9 3	55	1.35	1.00
Pine, Whire.	. 39	. 43	10.2	50	1.41	1 62
Poplar, Yellow .	61	.51	9.0	56	1.33	1 54
Redwood .	36	41	11 3	49	1.43	1.75
Spruce, Sitka.	50	56	10.0	69	1.20	1.26
	38	4.1	8.0	46	1 17	1.66

^{*}Specific gravity based on oven-dry weight and volume at test.

that all diagonal bracing wires could be omitted and the size of the longerons considerably decreased. The use of diagonal struts, running from the lower longeron at the points of attachment of the chassis struts and flying wires, to distribute the stresses from these members to several points on the upper longeron, is advisable. The ease with which a fuselage of this character can be built, together with its comparative lightness, makes it a close competitor of the newer, all-veneer body.

One of the chief advantages of the latter type is its high aerodynamic efficiency due to the excellent streamlining that can be obtained, and to the fact that changes in the attitude of a plane do not sensibly increase the resistance of such a faired body. In the veneer fuselage, the skin resists all the vertical and horizontal shear, and together with the longerons, it carries the bending moment produced by air loads on the tall surfaces or by dynamic loads. This second function that the contract of the body, and that of the core, transverse to the axis of the body, and that of the

Spruce plywood because of its lightness and stiffness has given excellent results, particularly in designs of fairly good depth and moderate length. But for the fuselages of larger, heavier planes, especially those which are relatively shallow heavier planes, especially those which are relatively shallow the planes of the planes of the planes of the planes of the planes are also associated in the planes of the planes are also associated in special planes. In the planes are also associated in the planes are also associated as the planes are also associated as the planes.

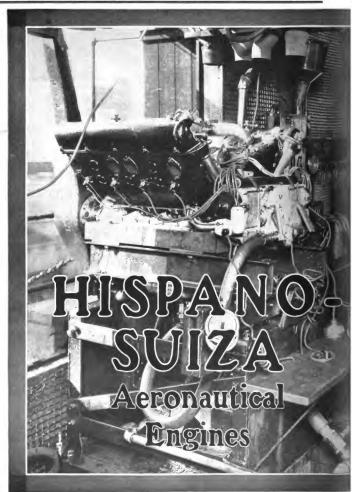
basswood core is most suitable.

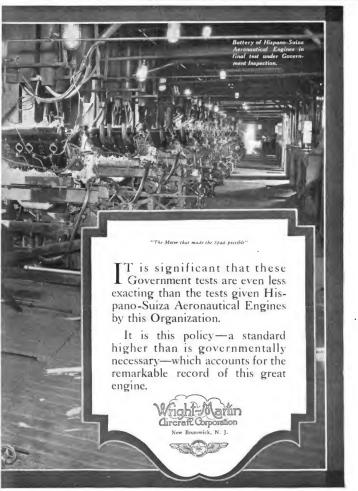
Since the bending moment increases rapidly forward of the rear cockput, it has been found economical to use more the rear cockpit forward to about the center of the engine section, than in the rear portion of the body. In a comparatively heavy inselage, for example, this rear section is usually of three-ply veneer and the critical section forward of the struction hear the engine section is to resist the great shearing struction hear the engine section is to resist the great shearing struction hear the engine section is to resist the great shearing struction hear the engine section is to resist the great shearing struction hear the engine section is to resist the great shearing struction hear the engine section is to resist the great shearing struction hear own and the present which is the same shown to a feather edge. For smaller bodies the skin is three-ply at the critical section of the present which is the same shadow of the present study. In this case fabric of the content of the same shadow of the present study of the same shadow of

and stiffness that it imparts to the skin. It divided into four longitudinal sections, the top, bottom, and sides. These points. The chief function of the top and bottom portions of the skin is to resist hearding moment, that of the side sections, to resist hearding moment, that of the side sections, to resist hearding moment, that of the side sections, to resist hearding stresses. The longitudinal sections join at the longerons to which the plywood is glued, and screwed or nailed. A scarf joint is considered superior to a butt joint, largely because it stands weathering better. In making transverse splices in the plywood it is the best practice to employ to 25, which with 3/22 in plywood, for example, forms a lap of about 26 ji. Such a joint would usually be made at a hulkhead. Figure 8 shows both longitudinal and transverse splices.



Fig. 8. Bulkheads and Longerons of Veneer Fuselage assembled an Jig, ready for Application of Skin







NAVAL and MILITADY AEDONAUTICS



Army Aviators in Cross Country Flight Flying from Globe, Arizona, to Phoenix, Arizona, in a De Haviland 4 Lieutenant Wilbur Wright, pilot, with Cap-tain J. T. Darrow, passenger, at an elevation of 7,000 feet passed over the Roose-velt dam and covered the distance between the two points 110 miles in 52 minutes. Topography of the country is exceedingly

rough and mountainous. Lieutenant Henry E. Wooldredge in a De Haviland 4 flew from Ellington Field, Honston, Texas, to Kelly Field, San Antonio, Texas, at a maximum elevation of 8,000 feet, a distance of 210 miles in 95 minutes. Returning in order to pass away from heavy thunder storms he rose to an elevation of 12,000 feet, made a considerable detour to escape the storms and vivid lightning, making the distance of 210 miles exclusive of the detours in

150 minutes. Lieutenant A. T. Steele carried an Air Service recruit from Birmingham, Ala., back to his station at Montgomery in a De Haviland. The distance of 200 miles De Haviland. The distance of 206 miles was covered in 93 minutes on a speed of

132 miles an hour.

Lieutenant R. S. Worthington on June
17 made what is believed to be a record for an SE-5 single-scater scout by covering the 500 mile distance between Palo Alto and San Diego in 260 minutes, an average speed of 115 miles per hour.

Naval Aviation Officers Get the Legion of Hono

Washington, D. C.—The French Gov-ernment has decorated more than a score of American naval officers, among them the retiring Commander in Chief of the Atlantic Fleet and some of the higher Atlantic Fleet and some of the figher ranking officers who served in important capacities under Admirals Sims, Wilson and Rodman in European waters, with the order of the Legion of Honor. Among the order of the Legion of Honor. Among the other officers to be so honored were Lieut. G. J. Romulus, who was at the naval air station at Brest; Lieut. R. E. Read, U. S. N. R. F., who was at naval aviation headquarters in Paris; Ensign

E. G. Rose, U. S. N. R. F., and Ensign H. G. Campbell, U. S. N. R. F., who was at the naval aviation station at Brest.

19,000 Hours Flown by Air Service Cadeta in Six Weeks

Washington, D. C .- According to a report from the Air Service, from April 3 to June 12, there were over 19,000 hours flown in training of air service cadets. There were eight fatalities in this period, or one for each 2,380 hours of flying.

War Department Turns Over Hispano Suiza Motors to Navy

Washington.-The Air Service has transferred to the Navy Department 50 H.P. Hispano-Suiza engines and spare parts for replacement, according to an announcement of the War Depart-ment. The Navy Department acquired the engines and parts at their actual cost to the War Department, which was \$227,-000. These engines were purchased by the War Department to equip bombing

Colonel Chandler Made Officer of the Legion of Honor

Washington, D. C.—General Collardet, Military Attache, French Embassy, an-nounces that the Government of the French Republic has conferred upon Col. C. de F. Chandler, Chief Balloon and Airship Division, Air Service, the rank of Officer of the Legion of Honor in recognition of the meritorious services rendered by Col. Chandler as chief of the American balloon service in France.

Air Service Fields May Be Used by Civilian Fliers

Washington, D. C .- The following statement has been issued by the Director of the Air Service regarding the employ-ment of Air Service planes and landing fields:

1. I. Flights in aircraft under the control of the Air Service are authorized for all training or war purposes and such other purposes as are here set forth:

- (a) For the proper execution of any ap-proved project of the Air Service or of the Air Service in co-operation with any other branch of the service or department of the Gov ernment-special approval of this office to be secured in each case.
- (b) For the demonstration of aircraft and aircraft development to officers of the Executive, Legislative and Judicial branches of the Govern-
- (c) For the rapid transportation of mili tary or civilian officials of the Government, of messages or parcels in cases of urgent necessity and for the convenience of the Government.

 (d) For the assistance of stranded ci-
- vilian aviators or where it is necessary for the saving of human life.
- Sary for the saving of numan are.

 2. The following may be carried as passengers in aircraft under the control of the Air Service:

 (a) Any person necessary to be carried
- as a passenger to accomplish the pur-pose of any of the flights authorized
- in Paragraph No. 1, above.

 (b) Officers and enlisted men of the Army, Navy and Marine Corps, both
- (c) Officers and enlisted men of foreign armies, as a courtesy when they are visiting the United States.
- 3. No person will be permitted to pilot aircraft under the control of the Air Service except regularly authorized Air Service pilots or bona fide student-pilots of

the Air Service.

II. 1. Persons operating aircraft who are not in the military service or who are not under the jurisdiction of the Air Service, will be permitted to use government facilities at Air Service stations contingent upon their proper observance of the air and ground rules in force at the particular station in question, and subject to the discretion of the Commanding Officer thereof as not interfering with the proper conduct of official busi-ness of his station, as follows:

(a) They may be permitted to land and



The Martin Bomber, which will attempt a trans-continental flight with but one stop, undergoing tests at the Army aviation field at Daytor

take-off from Flying Fields.

(b) They may be permitted to place aeroplanes in government hangars over night or for a short time pending

repairs.

2. The sale of gasoline, oil, spare parts, etc., or the furnishing of the labor of Air Service mechanics in any form to pilots not in the military service is forbidden.

Demobilization of Air Service

Demobilisation of Air Service
Washington, D. C.—According to reports received from the Air Service the
and enlisted strength from the date of
the armsitice to June 12 was 82 per cent.
The following table shows the preent distribution of personnel as comand per cent. decrease. The June 12 figures do not include 447 officers and 2,200
enlisted men in transit to or at demobilizaenlisted men in transit to or at demobiliza-

tion camps av			
	Nov.	June 12	Per cent.
Cadets	6,483	101	98
Enlisted men Officers		30,237 4,720	82 77
Total	197 771	35.058	82

During the week ended June 12, 1919, the decrease in the Air Service personnel overseas was 1,845 as against a weekly average of 1,343 for the four preceding weeks

The strength of the Air Service in the U. S. and overseas on November 11, January 30, and June 12 is shown in the following diagram:

	,	U.S.	Overseas
Nov.	11		77,889
Jan.	30	46,919	57,527
June	12	13,558	21,500

1,351 Discharged Flying Officers Enter

Washington, D. C.—From the date of the armistice to June 7, 1919, the num-ber of Air Service officers discharged was 14,292; of these 2,530, or 18 per cent. accepted commissions in the Reserve. Following is a comparison of flying and non-flying officers discharged and re-commissioned in the Reserve:

Number Accepted Per cent. ar-dis- Reserve repted Reserve charged commission commissions

Non-flying of-5 654 1.179 ficers Flying officers 8,638 1,351 16

Air Service At Sixty Per Cent. of Authorized Strength in Avance Zone Washington, D. C.—For the week ended May 21, 1919, the Air Service strength in planes operating in the Zone of Advance was 60 per cent. of the authorized strength. Of the planes on hand 65 per cent. were available for service.

In the following diagram is shown a comparison of planes "on hand" and "available" in the Zone of Advance: Pur- Obser-

vation Total suit Authorized strength 25 Planes on hand.... 27 121 Planes on hand.... 45 Planes available.... 16 31

Special Orders Nos. 139 to 143 Inc. Second Lieut. Aubrey W. Schofield is trans-ferred to the military hospital, Cooperstown, N. Y., for further observation and treatment.

Second Lieut, Charles H. Dowman is trans-ferred to General Hospital No. 28, Fort Sheri-dan, Ill., for further observation and treatment.

Capt. John D. Jones will proceed to Washing-ton, D. C., on temporary duty, not to exceed five days, for the purpose of a conference; thence to Hazelhurst Field, Mineola, Long Island, N.



Lieut. Brack-Papa (an left) and Capt. Guido, who will attempt the trans-Atlantic flight in a apeedy Fiat biplane

*Capt. Harold M. Gallop is relieved from fur-her duty at Harelburst Field, Mincola, Long Island, N. Y., and will proceed from Washing-ton, D. C., to Langley Field, Hampton, Va.

Second Lieut, Glen Eyre Wood will proceed to Langley Field, Hampton, Va. Second Lieut. Herbert E. Metcalf will proceed to Washington, D. C., and report in person to the Director of Air Service for duty.

Capt. Paul P. Rohinson will proceed to Car-ruthers Field, Benbrook, Texas.

Second Lieut. Bernard B. Robinson will pro-ceed to Langley Field, Hampton, Va. First Lieut. Robert J. Kennedy is relieved from further duty in the Office of the Director of Finance, Washington, D. C., and will proceed to Philadelphia, Pa., and report in person to the some finance officer for assignment to duty as

Second Lieut. Freeman Albery will proceed to Dayton, Ohio, and report in person to the Chief Engineering Division, Air Service, for duty.

Second Lieut. Thaddeus W. Shackleford will

proceed from Camp Little Rock, Ark., to Self-ridge Field, Mount Clemena, Mich.

Upon receipt of proper clearances, Cap. Arthur osding, Air Service is relieved from his present uties at the Air Service Mechanics School, St. ail, Minn., and will proceed to Fort Suelling, tinn., for discharge.

The following named officers are relieved from their present duties and will proceed to the sta-tions indicated: Capt. Gay. W. Arnold to Ayla-Second Lieut. Michael J. Hurtley to Aviation Re-pair Depot, Speedway, Indianapolis, Ind. and Second Lieut. William J. Tuttle to Taliaferro Field, Hicks, Texas.

Second Lieut. Meric R. Husted in relieved from observation and treatment at the General Hospital No. 2, Fort McHerry, Md., and will proceed to Garden City, Long Island, N. Y., and report in person to the commanding officer, Air Service Depot, that place, pursuant to provisions of Circular Letter 57, S. G. O., 1919.

Second Lieut, Stacey C. Hinkle will proceed to Mincola, Long Island, N. Y., and report in person to the commanding officer, Hazelhurss Field for assignment to duty with the 3d Aero

Capt. William H. Smith will proceed with the least practicable delay to Camp Owenhierne. Texas, and report to the commanding officer for discharge, under the provisions of Circular 75, War Department, 1918.

First Lieut Carl E. Rover is celieved from his present duties, and will proceed from Ross Field, Arcadia, Cal., to Hazelhurst Field, Mincola, Long Island, N. Y.

First Lieut, Alhert C. Adams, unassigned, now at Mitchel Field, Long Island, N. Y., is transferred to United States Army General Hospital No. 43, Hampton, Va., for further observation and treatment.

Second Lieut, Robert Leroy Warfield ia an-nounced as on duty requiring him to participate regularly and frequently in aerial flights from November 4, 1918, to December 9, 1918.

First Lieut. John F. Proctor is relieved from his present duties, and will proceed to Rockwell Frield, San Diego, Cal., and report in preson to the commanding officer for assignment to duty with the 2d Aero Squadron.

First Lieut, Carl L. Kohlmerer is announced as being on duty requiring him to participate regu-larly and frequently in aerial flights from April 1, 1918 to July 4, 1918.

Second Lieut. Sefua Sutton, Air Service, is relieved from his present assignment and duty, and will proceed to Camp Dix, N. J., and report to the commanding general for assignment to

First Lieut. Roy Robinson is announced on (Continued on page 825)



The Australian aviators who will attempt the England to Australia flight in a Blackburn "Kangaros". From left to cight: Lieut. Maddock, engineer; Lieut. Kingston Smith, pilot, and Lieut. Rendle, navigator



FOREIGN NEWS



Bossoutrob, French Aviator, Testa Smallest Plane in Existence A French aviator, Bossoutroh, has made successful experiments with the smallest aeroplane in existence, known as the "mosquito." It has a 20 h.p. engine, and measures 4 yards between the wing tips. It flew for an hour at an altitude of 5,900 feet.

Gathergood Wins London Aerial Derhy

Cathergood Wins London Arrial Derhy
London—The London Arrial Derhy
London—The London Arrial Derhy
London—The London Arrial Derhy
Gregating 190 mines in 87 minutes and 45 seconds. His average speed
was 400 miles in 80 minutes and 45 seconds. His average speed
was 400 miles in 80 minutes and 45 seconds. His average speed
to the speed of the sp

			ance
		From	From
	Turning points	Start.	Point.
		Miles.	Miles.
1,	Kempton Park (Waterworks north of railway station),	14	-
2.	Epsom (Grand Stand on Race Course)	24	10
	West Thurrock (Wouldham Cement Works, tall factory chimneys and large shed)	50%	2614
4.	Epping (Parish Church)	6736	1756
5.	Hertford (large White Cross in Field adjoining railway		
	station, north of town)	7856	1034
6.	The London Aerodrome, Hendon (Starting, Passing Over on first circuit, and Finishing at No. 1 Pylon)	945%	16

Aerial Mails to Greece

Arrial Malla to Greece
It has been announced in Atheus that the Italian government has informed the Greek government that it will start giving effect to the convention treently agreed between the two countries for air mail service. Two aerodromes are to be established, the one at Corfu, the other at Brindisi.

Aerial Defenses of Panama Canal Zone Being Strengther

Aerial Defenses of Passama Canal Zono Belog Strongthened The importance of the aerial defenses of the Passama Canal has tele to increased construction at Parace Field. The natural combiness of the increased construction at Parace Field. The natural combiness of land machines the heavily sounded and hilly natural or the land makes hadings nost hazardous. Steep of the parameter of the land makes hadings nost hazardous. Steep of the land has facilities for louring both land and see patients. More hangest and quarters are under combination and room to being The only Army Aero Squadron on the Zone at the present time, it was to be the land of the land

Single-matered Plana Long Distanca Record Held by French Single-matered Plana Long Distance Record Healt by French Callein from France amounce that the recent non-nog flight made to consider the property of the prop

Handley Page to Operate Buenos Aires-Pernambuco Service

Handley Pags to Operate Busses Aires Persambuses Service The Handley Page Co., Lendon, England, has secured concession as operate aeroplanes in Brazil. The concession is for ten years but does within two years the Government may demand that the pilots be Brazil and cristens, and that the machines must be registered with the In-The Handley Tags Co. will insuppress of 2000 bp, and capable bown. It is expected that the vogared between Busses of Aires and Persambuses and will use machines of 2,000 bp, and capable bown. It is expected that the vogare between Busses Aires and Fersian bows will be made in three days with stope at Ports Aires and Ros of the Control of the Control

Chair of Aeronantics at London University

London—It is announced that a chair of aeronautics has been instituted at London University. It is understood that several of the dider universities are contemplating the establishment of a curriculum for aeronautical engineering students, but it remained for London University to initiate the first regular course of study.

Amsterdam Exposition Postponed to August 1st

With further reference to the First Aeronaudial Exposition at Ansier-with further reference to the First Aeronaudial Exposition at Ansier-ies, and the second of the second of the second of the second perhaps August, a cable has just been received from Holland status perhaps August, and close that this exposition will be held instead, status; August 1, and close to the second of the perhaps are second of the second of

The Austin "Greyhound" Aeroplane

The Austin "Greybound" Aerophane
The Austin "Greybound" is enjoyed with a nincerlinder A. B. C.
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It is a size of the plane of the plane of the plane of the plane of the plane, the "bland" area being about negligible. The interplane that plane is the plane, the "bland" area being about negligible. The interplane intelled and percenting the waring of the wood appearanced in one-piece intelled and percenting the waring of the wood appearanced in one-piece.

With the object of securing a low inneff spread where angle of microw with the ground on hinding are done are;
with a positive fine deal being secured by the aid of an India spiker realistic.

tible WRICH COUTE'S TUME, INCOME.

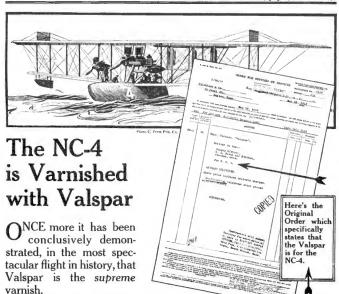
rotating.

rotating.

rotating and paid monufacture has been kept in mind in the design of the machine. Complete dual control has been provided. Two Vickers gons are fased to fire foreward, while a Lewis gun is mounted on a rotating ring on the rear cockpit.



The Austin "Greyhound" twa-seater. It has a 9-cylinder 320 H.P. radial A.B.C. engine



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The Navy Department varnished the NC-4 with

Valspar because of its ab-

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because it possesses the mar-

velous elasticity required to

stand the terrific vibration

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280 MADISON AVE.

NEW YORK



(Continued from page 807) yourselves and the United States naval service.

Admiral Glennon then shook hands with each of the airmen, telling them that they were free to do as they pleased until Monday, when they have to report to Washington for further orders. The offi-cers and crew of the three NC boats then walked to the end of the pier, where their walked to the end of the pier, where their wives and friends were waiting in a room set aside for them. E. H. Howard, former chief machinist's mate of the NC-4, whose hand was cut off by a propeller on the eve of the flight from Rockaway Point, was one of those who greeted the aviators. He told them that he was glad the accident had not happened before it did, for then he would not have had the opportunity of working on the scaplane which made history for this country. Howard, who is regarded as one of the best mechanics in the naval air service, is still under treatment in the hospital,

still under treatment in the hospital. Wearing the ribbon of the Royal Air Force Cross, which was first awarded to Hawker, and the emblem of the Order of the Tower and Sword, which was bestowed on him by the Portuguese Government. Commander Read talked briefly of the flight to Europe.

"I regret that the operation was not en-tirely successful," he said. "By that I mean that all of the three seaplanes did not get over. We have had a wonderful reception everywhere, but I am beginning to realize that the receptions are only just starting. If to-day's greeting is to be any criterion it will be a glorious home-

After gathering in the office of Briga-dier General G. H. McManush where they were congratulated by Colonel Archie Miller, commander of the army aviation field at Mineola, L. I., Colonel Frank Andrews, Inspector General of the Air Service, Captain King Snell, and other repentire party was taken in automobiles to

Manhattan. The navy's committee of welcome, in addition to Rear Admiral Glennon, included Captain P. Dymington, Lieutenant Commander W. F. Frost, Commander K. W. Cabaniss, in charge of the naval station at Rockaway Point, from which the NC planes started on their flight, and Lieutenant Commander Robert Donohue.

The piers at Hoboken were guarded by four hundred men of Companies C and D the 13th Infantry, under command of Major Barrett. While the reception to the returning fliers was in progress the soldiers stood at attention along both

soldiers stood at attention along both sides of the pier.

The personnel of the NC-4, which returned on the Zeppein, was as follows: Commanding officer, Lieutenant Commander A. C. Read; pilots, Lieutenant E. F. Stone and Lieutenant W. Hinton; radio operator, Ensign H. C. Rodd; engined to the control operator, Chief Special Mechanic E. Rhoades, Nerves Comments and Com

Reese. The members of the crew of the NC-3 who returned were: Commander J. H. Towers, commanding officer of the squadron; Commander H. C. Richardson, pilot; Lieutenant D. H. McCullogh, pilot; Lieutenant Commander R. A. Lavender, radio operator, and Lieutenant B. Rhoades, reserve pilot.

serve pilot.
The officers and crew of the NC-1 were; Lieutenant Commander P. N. L., Bellinger, Lieutenant Commander M. A. Mitscher, pilot; Lieutenant L. T. Barin, pilot; Chief Machinist Mate C. I. Kesler, ender, and Machinist R. Christensen, reserve pilot.

Among the invitations extended yes-

terday to the fliers was one from Glenn terday to the fliers was one from Glenn H. Curtiss, who asked them to be his guests at a dinner at the Commodore on the evening of July 10. At this dinner Mr. Curtiss will present to the commander of each of the NC boats a model of the plane. Secretary Daniels has promised to attend, and invitations have been sent to the Governor General of Newfoundland, Brigadier General L. E. O. Charlton of Brigadier General L. E. O. Charlton of the British Air Service, and scientists

(Continued from page 819) duty requiring him to participate regularly and frequently in aerial flights from March 18, 1918, to June 10, 1918.

The following named officers will proceed to Fort Sam Houston, Texas, and report in person to the commanding general, Southern Departs Southern Departs Entered M. Allieon and Second Lieut. William H. Laughlin. Second Lieut. Cornelius J. Maguire will pro-ceed to Minesh. Long Islands, N. Y., and report Firld for assignment to day with the 2d Acro Squadron.

The following named Air Service first lieuten-ants will proceed to Palm City, Cal., and report to the commanding general, Camp Hearn for duty with the Eleventh Cavatry: Albert H. Tebo and Iliram E. Wilson,

Second Lieut. Charles L. Webber will proceed to San Diego, Cal., and report in person to the commanding officer, Rockwell Field, for assign-ment to duty with the 2d Aero Squadron.

Capt. David S. Seaton will proceed to Washington, D. C., and report in person to the Director of Air Service, for duty,

Second Lieut. Thomas H. Marshall is trans-ferred to Army and Navy General Hospital, Hot Springs, Ark., for further treatment.

Lieut, Col. Harry W. Gregg will proceed to Washington, D. C., reporting upon arrival to the Director of Air Service, on temporary duty not to exceed five days, themee to Detroit, Mich., take stations there, assume command of the avia-tion general supply depol.







JULY 14, 1919



The British Dirigible R-34 Which Successfully Trans-navigated the Atlantic in 108 Hours

British Dirigible R-34 Successfully Trans-Navigates Atlantic From Scotland to United States





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VOL. IX

NEW YORK, JULY 14, 1919

NO. 18

THE R-34 CROSSES THE ATLANTIC

By HENRY WOODHOUSE

Chairman of the Dirigible Balloon Committee of the Acro Club of America, Vice-President of the Acrial League of America, author of the Textbooks of Military and Navy Aeronautics, etc., etc.

HE crossing of the Atlantic by the R-34 is an epoch making event and a splendid achievement, demonstrating what can be done by dirigibles.

The R-34 was at a disadvantage in this trip because it is

The R-34 was at a disadvantage in this trip because it is the first trip across the Atlantic, and there was no definite meteorologic data available to assist the navigators. Reading the log of the R-34 is very much like reading the log of an ocean liner, excepting that it was free from rough

seas.

Their ability to escape the angry waves and its greater speed are two advantages which airships have over ships of

Once the air lanes are charted and the prevailing winds are known and suitable arrangements are made to manage the airships on the ground when they land, aerial navigation by airships will be much easier than the navigation of ships at

We must learn to consider ships of the air as we consider ships of the sea. We must learn to operate and moor airships in the air, and only take airships into hangars when it is necessary to make repairs.

Towers and masts are to take the place of hangars for mooring airships, and the hangars will be used essentially as "docks" where airships are repaired.

With dirigibles of close to 3,000,000 cubic feet gas capacity already in operation, and others of 10,000,000 cubic feet capac ity being planned, the dirigible looms up as a potential factor in the development of aerial transport.

We have learned a lot about dirigibles during the war, and when what we have learned is put into effect the result will be the operation of large dirigibles capable of carrying 100 not the operation of large dirigities capable of carrying IW tons of useful load each trip and commercially operated and capable of staying in the air for weeks without stopping. Dirigibles have progressed very rapidly during the past eight years, but their greatest development is to come during

the coming three years, when we may expect to see 10,000,000 cubic feet dirigibles capable of a speed of over 100 miles an hour, capable of rising to a height of 30,000 feet when neces-sary to escape storms or take advantage of trade wind currents.

Great Britain now leads in aeronautics, especially in the construction of dirigibles. She has surpassed Germany. In the United States we have not yet begun to build large dirigibles, although they are most necessary to our national defenses and would be useful for transportation, to solve difficult problems of transportation.

Prompt Action Necessary

*HE United States Army, Navy, the Aero Club of America, the Aerial League of America and civilian aeronautic authorities are anxious to end the ten years spell of national procrastination regarding dirigibles and would like to have the United States purchase the R-34 or its sister airship the R-33 as a model ship to use as a pattern for constructing a larger one in the United States, and as practice ship for training a nucleus of personnel for a rigid airship service.

The cross Atlantic cruise of the R-34 has vindicated the sponsors of the rigid dirigible who have been urging the construction of rigid airships in this country for the past eight years.

construction of rigid airships in this country for the past cight years.

Among the pioneers who urged the United States to huild harge airships in the United States to huild large airships in the United States who was and who has been a persistent advocate of rigids for ten years; Rear Admiral Colly M. Chester, U.S.N., who urged the use of dirigibles for inaval operations in 1906, thirteen Charles DeF. Chandler, at present in charge of the Balloon Section, U. S. Army; Colonel Frank P. Lahm, U. S. Army; Colonel H. B. Hersey, U. S. Army; Major J. C., McCoy, U. S. Colonel H. B. Hersey, U. S. Army; Major J. C., McCoy, U. S. Lambert, U.S.A., all of whom were pioneers in the development of the science and art of aerostatics, which comprises the dirigibles and captive and free balloons. The construction of large dirigibles for the Navy was The construction of Large dirigibles for the Navy was The farst Board of Aeronautics, which was convened by the General Board of the Navy for the purpose of formulating an aeronautic policy for the Navy. This farst Board of Aeronautics consisted of mander C. B. Brittain, U.S.N., Assistant Chief of Burean of Steam Engineering; Leut, M. H. Simout, Chief of Burean of Steam Engineering; Leut, M. H. Simout, U.S.M. Bureau of C. and R.; Lieutenant J. H. Towers, U.S.N., A Prince Mowas Patrices of Vestates and Vestate and Vestate Commendations were made subsequently by Rear-Smith March, L. Britout Wow was Patrices of Vestates.

Similar recommendations were made subsequently by Rear-Similar recommendations were made subsequently by Rear-Admiral Mark L. Bristol, who was Director of Naval Aero-nautics; Commander V. D. Herbster, U.S.N., who was Naval Artache in Berlin; Commander J. C. Hunsaker, U.S.N., and Artache in Berlin; Commander J. C. Hunsaker, U.S.N., and Major Baldwin, Commander Hensaker, Commander Her-ster and several other authorities actually went to Germany to study the construction of Zeopenius and gashered the knowl-edge and data required to build large rigid dirigibles. Subsequently Admiral Sima, Admiral Taylor, and other Subsequently Admiral Sima, Admiral Taylor, and other

naval officers and Secretary Daniels himself urged building large rigid dirigibles

large rigid dirigibles. But once more the subject was treated like Mark Twain's meather. "Everybody talks about the weather," said Mark Twain's meather. "Everybody talks about the weather," said Mark The Army and Nay authorities, like the civilian aeronaptic authorities, now feel that the sure way of bringing this national procrashitation to an end is to purchase immediately a large dirigible from Great Britain and use it as a model for the construction of a larger one and to train engineers. and experts in this country

and experts in this country.

The Army can finish the large hangar under construction at Langley Field by the end of next month to house the R-34 or the R-33, and the Navy is ready to construct a large shed at one of the Naval Stations for future rigids.

All that is required is prompt decision to go ahead.

Heretofore the practice has been to send a commission to Europe to study the subject. When the commission was away the Army and Navy administrations changed, and when the commissions returned their reports were filed away and no action was taken.

It is recommended that from now on the policy be to bring the best dirigibles available to the United States with competent experts if necessary to co-operate with American experts

in producing even better dirigibles. Encouragement should also be given to American firms and inventors to demonstrate the value of their products. A number of original American plans for what seem to be promising dirigibles have gone begging for the past three years. These should be investigated. This is a young science and revolutionary developments are possible. Inventive genins and experiments should be encouraged

HOW THE R-34 WAS BROUGHT TO THE UNITED STATES BY THE AERO CLUB OF AMERICA AND AERIAL LEAGUE OF AMERICA

H OW the lunge British dirigible, the R-34, was brought to the United States by the Aero Club of America and the Aeral League of America, through the generous offer of a very progressive officer of the Aero Club and Aeral League, who guaranteed the expenses of bringing it to the United States, became known to-day through a report made to the Board of Governors of the Aero Club by Mr. Augustus Post, the Sccretary of the Club.

The report follows: To the Board of Governors, Aero Club of America.

Gentlemen

herewith submit to the Board the report of the acts increasing submit to the hoard the report of the acts which resulted in bringing to the United States the large British dirigible, which is on its way to the United States. This matter started last winter when Colonel T. F. Gilmore and another prominent British officer called on Messrs.

more and another prominent British officer called off Messra, Alan R. Hawley, the President of the Aero Cluli of America, and Henry Woodhouse, Vice-President of the Aerial League of America, and asked whether the Club and the League could assist in bringing to the United States one of the large British dirigibles, and stated that the greatest obstacle in the British drigibles, and stated that the greatest obstacle in the way of its coming was the lack of suitable landing place in a popular section of the United States.

It was found that the United States Army and Navy officials were willing to have this dirigible come over, but could

not take the initiative in bringing it over. Therefore the assistance of the Aero Club and the Aerial League was

enlisted. As there were not any civilian landing fields available, noth-

ing could be done at the time,

But in April, as soon as the Atlantic City Airport was established, an invitation was sent to the British Air Ministry

established, an invitation was sent to the British Air Ministry to soul the dirighle over.

The Air Ministry cabled that they were considering the invitation, and their eable was followed by a letter from Brigadier General, the first of the state of the control of the state of the control of the state of the control of the state of the state of the control of the state of the sta at a given price.

As the matter required immediate action and the Club and the Aerial League of America as organizations could not, without first canvassing their membership, assume the huge winnout first canvassing their membership, assume the huge liability of bringing over this dirigible, which cost \$2,900,000, an official of the Aero Club and of the Aerial League ar-ranged to guarantee all the expenses and to supply free of charge all the above mentioned equipment.

It was estimated that the total cost would be about \$70,000, excluding the cost of the grounds, and this gentleman stated he would be glad to meet this obligation for the Aero Club of America, the Aerial League of America and affiliated orof America, the Acrial Jeaghte of America and animated or-ganizations so as to bring this remarkable dirigible to the United States without delay. He also agreed to pay the ex-penses of entertaining the staff of the dirigible at Atlantic City for fifteen days. General Charlton was advised to this effect, and he called at the Chub and had a meeting with Mr. Alan R. Hawley and Mr. Henry Woodbouse, at which they went over every item of this project and a verbal agree. ment was entered into, which was confirmed in a letter dated ment was entered into, which was commented in a letter dated April 9 from Colonel E. Gilmore, Assistant British Air Attache, to Mr. Hawley, which is quoted herewith: From: British Air Attache, Washington, D. C.
To: Alon R. Hawley, Sia, President, Aero Club of America, New York City.

Following your conversation with General Charlton a cable

embodying your verbal agreement, of which the following is a

emodylng your verbal directions, of which in following is prophrase, was forwarded to the Air Ministry: Begins:—In connection with the proposed visit of a British dirigible the Aero Club of America and affiliated with the well guarantee all expenses pertaining to hydrogen oil, petrol, police, labor, housing, subsistance of personnel oil, petrol, police, labor, housing, subsistance of personnel oil, petrol, police, labor, housing, subastance of personnel and mooring ground, requiring in return that airship visit Atlantic City during May, remaining at least fifteen days, If desirable, accommodation as terminus at Atlantic City available all summer. I recommend the visit and consider the terms satisfactory. A guarantee that the State De-

the terms distributions of operatine that the Sane per-partment will raise no objection veil follow. Ends. Will you kindly be return of post notify that this is satis-factory to you, upon which General Charlton well consider, conditional to a final ratification by the Air Ministry, the

terms settled.

(Signed) T. E. Gilmore, Ass't. Air Attaché. Washington, D. C. The agreement was confirmed in the following letter to

General Charlton, dated April 15, 1919: Brigadier General C. E. O. Charlton, D.S.O.,

Brigader General C. E. O. Charlion, D.S.O.,
British Art Altochi,
Department of Millary Aeronautics,
Washington, D. Charlion,
My dear General Charlion.
My dear General Charlion:
He dearly among the terms stated in your
letter of African Charlion of the terms stated in your
letter of African Charlion.
He was a state of the terms of the British
dirigible to Allantic City during the month of May and, position for all summers.

dirighbe to Allantic City during the month of May and, pos-sible, for all summer, Germanet of our knowly ex-operation in the state of the control of the state of the con-trol of the control of the control of the con-trol of the control of the control of the con-can be of assistance in your splended work, we remain the control of the control of the control of the con-trol of the control of the control of the control of the Allantic City Aero Club, through its President, Mr. Albert T., Bell, who has been a piencer worker in aeronautics and arranged for the aviation meet held in Atlantic City in 1910 and also for the Vaniman dirigible projects in 1911, offered its co-operation in arranging for the receiving and mooring the dirigible at the Atlantic City Airport and also

mooring the drigible at the Atlantic City Airrort and also co-operated in securing the approval of the Department of State for bringing the dirigible over.

The Department of State answered that it had no objection to the dirigible coming over and that it had submitted Department had any objections, but they believed that, whereas the dirigible is an official dirigible of military character, it should land in the United States at an Army or Naval Station. It was stated that it would also be advisable to secure the aphraphic that the dirigible is an official dirigible of the Arm Club, who were cooperating in this matter, agreed that, in view of the fact that the dirigible is a British military dirigible, it would be advisable to have it failed as a Army or Naval Station, and that the dirigible is a British military or Naval Station, and that the dirigible is a British military or Naval Station, and that the dirigible is a British military or Naval Station, and that the dirigible is a British military or Naval Station, and that the dirigible is a British military or Naval Station, and that Pending the making of such arrangements with either the

it would no best to turn over the proposition to them. Pending the making of such arrangements with either the Armonic March and the such a such as the such as th

Tumulty referred the letter to the Department of State, which assured us of their approval. Governor Edge gave his

which assured us of their approval. Governor Edge gave his approval in the following letter to Mr. Bell, President of the My dear Mr. Bell:

I have yours of the 10th instant, and it gives me pleasure on behalf of New Jersey to second the efforts of the Atlantic City Aero, Usb and the Aero Club of America to have Atlantic City selected as the landing place for the British dirigibles,



THE NEWS OF THE WEEK



Aero Club Luncheon to NC Crews July 10

The luncheon planned by the Aero Club of America, in honor of the navy's transatlantic flyers, for July 2, which could not be given on that day because the commanders of the flying boats had to report at Washington, has been set for July 10 at the Waldorf-Astoria. An announcement to that effect was made over the signatures of President Hawley of the Aero Club and H. Pushae Williams, President of the Queensboro Chamber of Com-

The Aero Club will present medals to the aviators. Prominent officials of the navy, the army and the Government will be present.

\$3,500,000 Expenditure for Naval Dirigible Hangara

Washington, D. C.-Under authority of the Naval Bill, construction on two large dirigible hangars will be begun in the near future. Rear-Admiral Taylor, head of the Bureau of Construction and Repair and Rear-Admiral Parks, Chief of the Bureau of Yards and Docks have been ordered to prepare the plans for the two hangars, which will probably be erected somewhere in the state of New Jersey.

Joseph A. Steinmetz Elected President of Engineers' Club of Philadelphia

Philadelphia, Pa.-Mr. Joseph A. Steinmetz, president of the Aero Club of Pennsylvania, was recently elected presi-dent of the Engineers' Club of Philadel-phia. Mr. Steinmetz, in addition to be-longing to many technical and industrial organizations, including the Aero Club Janney, Steinmetz and Co. His election to the new honor has caused a great deal of felicitation and satisfaction among the

Los Angeles to San Diego in 75 Minutes

San Diego, Cal.—Lieut. A. Brokaw, piloting a Spad scout, flew from Los Angeles to San Diego, a distance of 160 miles, in 75 minutes.

Bishop to Preach From Dirigible Car

Columbus, Ohio. — Pending sanction from the War Department, plans are being made by the officials of the Methodist Centenary for a sermon by one of the bishops from the decks of a huge dirigible, the A-4, which has arrived here from Akron. If plans materialize, a bishop will ascend with the four army officers and will deliver his sermon through a large megaphone.

Dr. Helm Buys Curtiss Plane to Cover Professional Rounds

Professional Rounds
Garden City, L. I.—As a result of the
successful use of the aeroplane by Dr.
Frank Brewster of Beaver City, Neb., in
making professional calls, Dr. W. B.
Helm of Rockford, Ill, Ila, so ordered a
Curtiss biplane. He was a visitor at the
Curtiss plant at Garden City recently to
look over a plane he expects to use in
Illinois. He is one of the best-known Illinois. He is one of the best-known surgeons in the middle West. Dr. Brewster recently flew sixty miles to perform an operation, making the trip in fifty minutes. It would have required two and a half hours by automobile and more than four hours by train.



Phitsgraph of the reception and bunch given to the commanders and stuff of the NC suspinates in Paris, by the Foreign Service Committee of the America, on June 12th, at the former Aviation Officers Cube. The American Amhanasday, Hon, Huigher Captillage, as Honger and the American Amhanasday, Hon, Huigher Captillage, as Honger Lts, Mitscher, McCullich, Stone, Baris, Haiten, Bresse, Redd, Criticalisanes, Theades and Kensier.

Bon, Hugh C, Walker, American Amhanasder; Sidany B, Valt, Robert Woods Blins, William S, Hegan, Dr. At. Lillword, Legis D, Benn, Hugh C, Walker, American Amhanasder; Sidany B, Valt, Robert Woods Blins, William S, Hegan, Dr. At. Lillword, Legis D, Benn, Hugh C, Walker, American Arisin Fraiding, Sarretary American Amhanasque, Prol. Mark Paldovin, Former Prinz, Paris Scotion, U. S.
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The huge Handley Page biplane which The nuge standary Page oppane which has been at Harbor Grace, Newfound-land, for the past few weeks preparatory to a transatlantic flight, attempted a flight from Newfoundland to the Atlantic City Airport on July 5, but was forced to land through engine trouble at Parrsboro, N.S., 525 miles from the starting point. The incomplete reports which are available as we go to press would indicate that the damage done to the machine is so great that it will be unable to proceed to its destination. None of the crew was injured.

Banquet to Commander Read and NC Crews

Lieut. Commander A. C. Read, American naval flyer who crossed the Atlantic in the NC-4, and Commander John H. Towers and Lieut. Commander P. N. L. Bellinger, who also attempted the crossing and made a gallant fight in reaching the Azores, were dined at the Hotel Commodore on July 3.

Commander Read told the people present that the airboats of the future will have to be considerably larger than the NC craft.

At the guest table besides the aviators were Major Gen. Charles T. Menoher, Chief of the Army Air Service; Rear Admiral James H. Glennon, commandant of the Third Naval District; Commander H. C. Richardson of Commander Towers' crew; Commanders J. C. Hunsaker, G. C. Westervelt, Glenn H. Curtiss, United States Senator New of Indiana, Congressman La Guardia, and Brig. Gen. L. E. O. Charlton, British Air Attaché at Wash-

Army Aviator Elopes in Aeroplane

Hays, Kans.-Lieut. Warren P. Kite, for twenty-two months instructor at Kelly field, eloped with Miss Orpha Kate Field, eloped with Miss Orpha Kate Arnold, ranch owner and oil operator of Larned, Kans. After a 55-minute flight, he landed at Hays, where the ceremony took place. Lieut, Kite arrived at Larned nine days previous to the wedding in order to participate in local homecoming celebrations, during which he became acquainted with the bride. Lieut. Kite is from Springfield, Mo., and will make his home there.

Handley Page Attempts NewfoundlandAtlantic City Flight Washimmon_A De Haviland-4 acro Washimmon_A De Haviland-4 acro-

Washington.-A De Haviland-4 aero-lane flew recently from Hazelhurst Field. plane flew recently from transcript Mineola, to Albany, with spare parts, to make minor repairs on one of the seven De Haviland planes in the squadron mak-

ing the Dallas-Boston flight.
Col. H. B. Claggett, commander of the squadron, telephoned Col. Archie Miller, at Hazelhurst, to send up the spare parts, Sixty-five minutes later they arrived. Fifteen minutes were required to make the repairs. Sixty minutes later Lieut. Ralph C. Kilpatrick, pilot, and Major Henry J. E. Miller had returned to Hazel-lurst. They made the 220 miles of the round trip in 125 minutes.

Navy Dirigible C-8 Explodes

The U. S. Navy dirigible C-8, sister ship of the C-5, which was blown to sea from St. John's, Newfoundland, some weeks ago, and never heard of again, exploded with great force at Camp Holaploded with great force at Camp Hola-bird, near Baltimore, Md., on July I, just after having made a forced landing while on her flight from Cape May, N. J., to Washington. It is uncertain if the sud-den heat in the atmosphere to which the ship was subjected when she made her landing, or the careless handling of a cigar or cigarette by some civilian, ignited the gas. A large crowd surrounded the craft at the time of the explosion and several civilians were burned, but none killed. The officers, crew and passengers of the dirigible who escaped injury in-cluded Lieut. N. J. Learned, U.S.N.R.F., commanding officer; navigation officer, Lieut. R. I. Weyerbacher, U.S.N.; direc-tional pilot, Ensign C. W. Tyndall; en-gineer, Warrant Officer B. F. Sherman; gineer, Warrant Officer B. F. Sherman; Machinist's Mate Kellar and Radio Operator Lynch. The passengers were Lieut. Commander Quigley and Lieut, A. R. Til-burne. A court of inquiry was ordered to determine, if possible, the cause of the explosion.

Lowney's Chocolates Delivered by Air Boston, Mass.—Deliveries of Lowney's chocolates by aeroplane was inaugurated on June 27, between Boston and Portsmouth, N. H. Circulars were dropped from the plane which was piloted by A. Terhune, Jr., general manager of the North Shore Aerial Transportation Co.

Air service of the Army has accepted the offer of the Chamber of Commerce of Americus Georgia to furnish a bale of of Americus Georgia to Iurnish a bale of cotton to be transported by aeroplane from Americus to the Merrimac Manufactur-ing Company at Lowell, Mass, to be manufactured into print cloth of a spe-cially prepared design submitted by the Air Service and to be distributed by aeroplane as a souvenir representing acrial progress in the transportation of raw material from the cotton fields of the south to the factories of the north to be manufactured and distributed as a finished product.

Mayor Perry D. Thompson, of Lowell, has completed arrangements for the reception of the cotton and its manufacture into cloth and President J. E. Hightower, of the Americus Chamber of Commerce, will have it compressed for shipment. Orders have been issued to the commanding officer at Souther Field, Ga., to pro-vide the aeroplane and assign an officer to make the flight and to the Air Service fficer of the Northeastern Department at Boston to designate a suitable landing place at Lowell

It is quite probable a DeHaviland 4 will be used to transport the cotton. Distance via Washington, New York and Boston about eleven hundred miles.

NC-4 to be Placed on Exhibition in New York

Washington, D. C.—Secretary of the Navy Daniels, in response to numerous suggestions, has ordered Rear-Admiral Glennon to make arrangements for exhibiting the NC-4 in Central Park, New York City, for a period of one week, provided City officials approve the plan.

Count di Zopolla, of Italian Air Service, Weds Miss Mortimer

Count Maris di Zopolla, of the Italian Air Service, who took an active part in the air service on the Italian front, mar-ried Miss Edith Mortimer, daughter of Mr. and Mrs. Stanley Mortimer.

Aerial Board Created in Canada

An Aerial Board has been created in Canada under an act passed during the present session, with Hon. A. L. Sifton, chairman; General Mewburn and Hon. C. chairman; General Mewburra and Ilon. C.
Ballantyn erpresenting the militia and
naval service departments respectively, as
members; Lieut-Col. C. M. Biggar, viceGeneral; J. A. Wilson, assistant deputy
Minister of Naval Affairs, and Edward
General; J. A. Wilson, assistant deputy
Minister of Naval Affairs, and Edward
The board will frame regulations: regarding civil flying. Present regulations
in force were passed under the War
Measures Act and will hapse with the decmatters connected in will supervise an
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control and management of aircraft necessary for the conduct of the public ser-vice; the fixing of routes of travel, etc.

First Flight Over Adirondacks Successful Lake Placid, N. Y.—In the first aero-plane to fly over the Adirondack Moun-tains Lieutenants W. R. Taylor and F. Paul Stevens arrived here on July 1, after a 300 mile flight from Mineola to take part in the official homecoming welcome to be extended to its war heroes by Essex County.



Los Angeles "said it with flowers" to Eddie Rickenbacker, on his first visit there after his re-turn from France

Curtiss "Oriole" to be Delivered From Garden City to Denver by Air

In order to facilitate delivery of a Curtiss "Oriole" which he purchased, I. B. Humphreys of Denver, Col., is sending a pilot to New York with the intention of flying the plane to Colorado. A. M. Lennying the plane to Colorado. A. M. Lendrum, who is an experienced army pilot, is expected to leave New York early next week to make the flight. The "Oriole" is the plane that won the prize for being the first to fly to Atlantic City. This one will be equipped with one of the new Curtiss K-6 150-horsepower motors. It is de-signed especially for high altitude work.

Bout in An Aeroplane Latest Recruiting Stunt

The recruiting service of the Army has planned a novel stunt in connection with their recruiting campaign. A boxing match aboard an aeroplane will take place over Camp Dix, providing the New Jersey State Boxing Commission enters no objection, though how far above the earth the authority of the commissioners may

run is a question. Lieut. John S. Donaldson, of the First Pursuit Squadron, challenged all comers to meet him with gloves. The challenge was accepted by Lieut. Leroy M. Wightman, a machine gun officer handy with the padded mitts. The boxers will be the padded mitts. The boxers will be belted within a tiny ring in the tonneau of a large bombing plane so that there will be no danger of a plunge to earth in case of a knockout. The flying ring will be driven by Sergeant John Moore, and it is planned to have the referree and timers in another plane that will keep alongside the boxers' plane so that they can judge the points and time the rounds.

San Diego to San Francisco Non-Stop Flight in 41/4 Hours

Washington, D. C .- Official announcement from the Air Service states that on July 2 two army aeroplanes, a De Havi-land 4 and a La Pere fighter covered the 610 miles between San Diego and San Francisco in 272 minutes, at an average of 136 miles an hour. Lieut, John W. Sharmack piloted the La Pere with M. S. E. Barnard as passenger, a Lowell H. Smith flew the DH-1. and Capt.

Sales of Surplus Supplies

Washington, D. C .- The Director Sales announces that on June 20, \$3,254,-619 had been paid for surplus material from the Department of Military Aero-nautics, which cost the War Department \$21,700,000. The surplus of November 11 is valued at \$85,000,000, of which 26 per cent is sold. For the Bureau of Aircraft Production the figures are as follows: Surplus, Nov. 11, 1918, \$62,000,000; value of material sold, \$5,400,000; price paid for material sold, \$3,317,809; percentage of surplus sold, 9%,

Woman of 80 in Aeroplane Flight Washington,-Mrs. Martha H. O'Neill, Washington,-Mrs. Marting La. on June 80 years old, of Gettysburg, Pa., on June 20 years old, of her first experienced the thrills of her first ht in an aeroplane. She had won the flight in an aeroplane.

flight in an aeroplane. She nau won un-right to make this flight by selling the largest number of Victory bonds in the recent campaign in her home town. She was a passenger in an army aeroplane pi-loted over Gettysburg battlefieldd by loted over Gettysburg battlefield by Lieut, Fred Nelson of the Aviation Supply Depot staff at Middletown, Pa.

Aeroplane Reconnaisance to Locate Mosquito Breeding Places a Success One of the novel uses to which the

aeroplane is now being put is that of locating pestilential swamps and marshes. The Navy Department reports that Ensign Van Court, of Hampton Roads, recently made a successful trip along the North Carolina coast in the vicinity of Morehead City for the purpose of spying out territory which should be drained or purified.

Ensign Van Court's job particularly is to find the breeding places of mosquitoes, and as those are discovered steps are taken by sanitation engineers for their elimination.

Admiral Sims Predicts Extended Use of Aerial Bombs and Torpedoes in Naval Warfare

New Haven, Conn.—In depicting the naval battle of the future in an address at the alumni banquet of Yale University, Admiral William S. Sims emphasized the importance of aircraft in deciding naval combats.

"Aeroplanes will launch torpedoes that have a range of more than five miles," said Admiral Sims. "Other 'planes will said Admirai Sims. Other planes will drop bombs of great size, weighing 3,000 pounds, and still others will control by wireless super-torpedoes carrying an ex-plosive charge of more than one ton. Fleet submarines may be present in great numbers, and many automatic mines may be laid in front of the fleets.

With both commanders determined to "With both commanders determined to fight a decisive action, the issue will be decided in a short time, and the result will be the practical destruction of the defeated fleet."

Chaperones Must Accompany Vassar Girls on Aerial Joy Rides

Poughkeepsie, N. Y.—Because a stu-dent at Vassar took a long air ride with a young lieutenant in the U. S. Air Service, the possibilities are that aeroplane joy rides may become prohibited by the social laws of Vassar College. The stujoy rides may become prominted by the social laws of Vassar College. The stu-dent's name has been withheld, but be-cause of her exploit the students have considered inserting rules for aeroplaning into the laws, which are made and en-forced by the students' association.

An army aviator was flying over the college grounds, and landed in the driving park. He asked one of the students strolling nearby whether she would care to go up with him, and she accepted. It is not yet decided whether this is a viola-tion of the rule against going riding un-chaperoned but aviators are advised for the present to use three-passenger planes.



The Bristol Coupé with 264 H.P. Rolls-Royce Engine

BRITISH DIRIGIBLE R-34 SUCCESSFULLY TRANS-NAVIGATES ATLANTIC FROM SCOTLAND TO UNITED STATES

THE British dirigible R-34 arrived at Roosevelt Field, Mincola, L. l., at 8:45 o'clock in the morning of July 6, circled the field three times to make observations, and at 9:21 o'clock the first overseas air pilgrim Major John Edward Maddock Pritchard, landed upon American soil, after a parachute drop of 2,000

This completed the longest flight in his-tory, the distance covered being 3,200 miles, not counting the mileage forced upon the flyers by adverse winds. The time consumed was a few minutes more than 108 hours. The big airship brought

than 108 hours. Ine big airship brought wover thirty-one persons, one of whom was a stowaway, and a tortoise shell cat. The R-34 was huilt for the British Admiralty at the Airship Works of Wm. Beardmore & Co., Ltd., Inchinnan, Renfrewshire, Scotland. The ship is about 650 ft. long by 80 ft. in diameter, and it has a capacity of more than 2,000,000 cubic feet, with a useful lift of over 30 tons. She is fitted with Sunbeam-Cossack engines and capable of attaining a speed of about 70 miles per hour. The ship's

of about 70 miles per hour. The ship's complement numbers about 30.

The R-34 is one of the two largest dirigibles in the world and is about 670 feet Although the construction of the long. two dirigibles had been in progress at Inchinnau, near Glasgow, for months be-fore the end of the war, it was not until last February that the Admiralty admitted

that it had plans for airships even larger than the German Zeppelins.

The R-33, equipped as an aerial battle cruiser, had her trial flight about March 1, and her sister craft took to the air a few days later. It was announced on March 22 that the war equipment of the ships would be partly dismantled and that they would be prepared for a flight across

the Atlantic. It is an open secret that the large rigid airships, R-33 and R-34, do not represent the last word of the Admiralty in this branch of aeronautical effort. There are in hand at the present time at least four other rigid airships of greater size than other rigid airsnips of greater size than the R-34, representing a distinct step in advance of any already produced, and it is understood that their completion is hoped for by the end of the year.

The secret of successful long distance

flying lies mainly in the efficiency and renying lies mainty in the emicency and te-lability of the engines, which, in the case of the later rigid airships built or build-ing for the Admiralty, are of Sunbeam Coataleu design. The R-34 is fitted with four 350 "Cossack" type engines, whilst the four 58 "cossack type engines, within the woothers in addition to having a similar number of "Cossack" engines are equipped with two "Maori" engines of 250 hp, each, making a total of 1,900 hp, for each airship. Such figures of engine power in comparison with what obtained in the early days of a viation, when perhaps a 20 h.p. engine was the sole unit, are staggering, but it is safe to say that even now the limit of engine power has not been reached. A very high degree of general efficiency and power maintenance over long periods has been attained for some time past by Sunbeam engines, which possess a reputation second to none.

sess a reputation second to none.

The Sunbeam Maori engine is of the 12 cylinder, 60°, water-cooled, "V" type, rated at 250 h.p. At ground level the b.h.p. at 2,100 r.p.m. is 265 and at 2,200 r.p.m., 260.

Bore, 3,93" (100 mm.); stroke, 5,31" (135) mm.). Bore and stroke ratio, 1.08 to 1. The mean effect of pressure in pounds per square inch is 128. Compression ratio, 3.6 to 1.

There are four valves per cylinder, two let and two exhaust. Inlet valves have There are four valves per cylinder, two inlet and two exhaust. Inlet valves have a lift of .3543" and exhaust valves a lift of .3500". The firing order of the cylinders is as follows: 1-5-3-6-2-4. Magnetos are used. The W.B.G. Magnetos each weigh 19.1 pounds and their speed x engine speed is 1.5. K.L.G. or B. spark plugs are used. Two gear type oil pumps, one centrifu-

gal water pump and one plunger type air pump are provided. Four C.H.B.Z.S. 42

carburetors are used. The ratio of gear reduction is 2 to 1 in the "Maori" aeroplane engine, and the propeller is run at one-half engine speed, but in the airships R-33 and R-34, the

propellers are driven direct. The engine complete weighs 830 pounds. Fuel is consumed at rate of 139 pints per hour and oil at 6.5 pints per hour.

The overall dimensions of the Sunbeam "Maori" are as follows: Length, 55.11"; width, 35.46"; and height, 33.85". When the Air Ministry began to discuss the ocean flight it was planned that one

of the ships should take a northerly course and the other should proceed to America by swinging to the south. In dismantling the war equipment, however, it was found that there was too much work to do on the R-33 to prepare her for the flight, and it was decided that only the R-34 should be remodeled. In carry-ing out this plan the Admiralty formally took over the dirigible from the Air Ministry about May 30 and sent her out on a series of practice flights. The ocean flight was held up by the uncertainty preceding

was need up by the uncertainty preceding the signing of the Peace Treaty, and the airship took a test flight toward Germany. The length of the vessel is equal to that of a good-sized ocean liner, and she has a beam of seventy-nine feet, making her almost as wide as some of the large ocean-going ships. From the bottom of ocean-going ships. From the bottom of her lowest gondola to the top of her gas-bag is about ninety-two feet. She has five cars, or gondolas, suspended from her framework, and all are connected by an immense platform about 600 feet long.



The officers in charge of the R-34 on its epoch-making journey from Scotland to America

A wireless set in the forward gondola has a range of about 1.500 miles and will be used in enabling the captain to direct his course if the sun and stars are obscured.

The airship weighs about thirty tons, and its useful load is about twenty tons, according to Colonel Lucas. According to the same authority it displaces about sixty tons of air.

Major G. H. Scott, the commander of the R-34, described the trip as follows:

"The voyage was a very enjoyable and most successful one. The total mileage was 3,200, and we covered that distance in 108 hours and 12 minutes. The thunder squalts we encountered on the way across caused the delay.

"We will leave for home on Tuesday morning about daybreak. We may start around eight o'clock. That is not settled definitely yet, and much depends on the atmospheric conditions.

"We are not certain whether we will go to Washington and Philadelphia, but probably will not. We are planning now to make a flight over New York City before we take out across the ocean. We may go back by way of Boston.

"The return trip, I think will not take more than seventy hours. Of course it will not be so difficult, as we will have the wind with us and probably will meet better weather conditions.

"Coming over we had a crew of thirty men and one stowaway. Not one man suffered any kind of illness. We were all in fine shape when we landed at Roosevelt Field. But we had only enough gasolene to operate a few more hours, and you can see we were very fortunate.

"The stowaway will not make the return trip, but will be left here. He probably will be court-martialed in the near future, but I do not think he will be subjected to any severe punishment. The only change in the crew on the way back home will be the addition of Lieutenant Commander W. A. Henssley, of the



The "crow's nest" of the R-34



United States Naval Air Service, who will take the place of Commander Zachary Lansdowne.

"Some of the time we were flying as low as four hundred feet above the ocean. At other times we were as high as 6,000 and 7,000 feet. The altitude varied greatly. All the way over it depended on the wind. We had to keep changing our altitude with the changes in the weather. We encountered strong winds and used five engines, and then at times when the weather was real good we only used two engines. We ran out of gas sooner than we expected because of the strong winds.

"Had the heavy wind over the Bay of Fundy continued through the night we would have been forced to rand near Boston. We would not have been able to have made Mineola. The change in the wind came early this morning and it was then that I decided that we could reach Roosevelt Field. I ordered the course changed then.

"We had only four ticklish moments on the way over. Those were during the thunder squalls. They were not serious, however. The only thing that we really feared during the storm was damage to the frame or rudders."

On board the R-34 was a stowaway, formerly one of the crew, who had been dropped a couple of hours before the dirigible left Scotland for the United States. He was found the second day

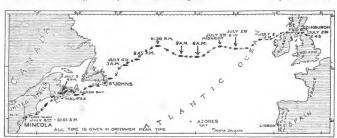
out and had to "work his passage" over. W. W. Ballantine, the stowaway, had an interesting tale of the trip. He said he lives in Cromwell, and up to two hours before the R-34 left East Fortune, Scothe was one of the crew, a rigger. He declared also that a few years ago he

was a prize fighter in England. 'I was a rigger on the R-34 and was never more surprised in my life than when I received orders two hours before the dirigible sailed that I was not to be taken along. I was in the rigging when I re-ceived the sad news, but I made up my mind then and there that I was going

Secretary of the Navy Daniels sent the following message to Major J. H. Scott: "The American Navy extends its greet-ings to you and to the heroic crew of the R-34 and congratulates you on the success of your great flight across the ocean. arrival in America of the first lighterthan-air craft to cross the Atlantie marks another decided advance in navigation of the air. Coming so soon after the flight of Read, Alcock and Hawker, it completes a remarkable series of achievements in aviation in which British and Americans may take a just pride and which have served to increase the cordial relations and comradeship of the two navies which have prevailed throughout the war. have prevailed throughout the war.

America joins with Britain in honoring
you and the service you represent.

"JOSEPHUS DANIELS."



The route of the R-34 from East Fortune, Scotland to Mineota, a journey of approximately 3200 miles, made in 108 hours



The AIRCRAFT TRADE REVIEW



Valspar Shipped by Aeroplane

Valspar Shipped by Aeroplane
The first shipment of varnish by aeroplane was made on June 26th by Valentine & Co., who sent one hundred cans of
Valspar from their Brooklyn factory to
C. V. Schelley & Bro., their local dealer
at Allentown, Pa.
The cargo left-the field at Long Beach,
L. 1, at 945 a. m. and covered the one
hundred, miles in seventy-six minutes.

nundred miles in seventy-six minutes. This flight was made in a Canadian JN-4, during a steady rain, and with low langing clouds along the trip. Owing to the necessity of getting the shipment to Allentown in time for a Friday sale, the trip was carried through in spite of the in-

clement weather.

Lieut. Lyman B. Lockwood and Lieut.

Edw. K. Merritt were the pilots on this

strip, which was the fourth to Allentown,
operated on a regular aerial delivery service between the two cities, by the American & Canadian Allied Flying Circus, Inc., of New York.

The plane was Valsparred the day previous to the flight, and in spite of the steady rain which continued throughout the flight it was in as good condition as

when it started. Mr. Frank-P. Connolly, manager of the specialty department of Valentine & Co., who suggested the flight, was highly elated over the record made, and expressed his dence in the aeroplane as the vehicle of the future for the transportation of merchandise.

Splitdorf Auxiliary Magneto Solved Prob-lem of Starting Liberty Motors

A most picturesque but risky method is ordinarily used to start aeroplane engines.

The mechanic shouts "Off!" as he approaches the propeller and is answered in kind by the pilot at the switch. He then spins the great wooden blades by hand to charge the cylinders with gas. Having worked up a warm perspiration, even on the frostiest mornings, he springs clear and shouts "Contact!" The pilot indicates that he has closed the switch by repeating the signal, and the mechanic once more approaches the propeller. With a single swift motion he twirls the blade through an arc of more than 90 degrees and steps quickly away from and to the side of the murderous whirling stick,

A 150-horsepower engine is about all any but a Samson can swing. When heavier engines, culminating in the 400horsepower Liberty, made their appearance, new methods had to be devised. At first, the blade was pulled over compression, by running past it, giving it a smart pull in passing. Sometimes two men with hands joined were required. As many as three were required to do the preliminary one unwary mechanic was sucked into the whirling circle of the propeller and injured before a safer method was devised.

Owing to their weight and complication, electric starters were not considered serielectric starters were not considered seri-ously, but an ingenious auxiliary magneto was contrived by the Spitdorf Electrical Co. of Newark, N. J. This magneto was operated by a small hand cronk in the plots cockpit. The engine was charged in the usual way, whereupon the mechanic stepped back, shouting "Clear!" The plot then tosed the switch and turned



the crank of the starting magneto a few times. The supercharged cylinders received a shower of white-hot sparks and failure to start at a lively clip was ex-ceptional. With the Dixie starting mag-neto a lone pilot might start a 400-horsepower engine unaided, a thing previously impossible.

Will Not Restrain Aeroplane Sales

Federal Judge A. N. Hand has denied the motion of the Curtiss Aeroplane and Motor Corporation for a preliminary in-junction restraining the United Aircraft Engineering Corporation from continuing an alleged infringement of fourteen patents covering the JN-4 aeroplanes. After the war the defendant bought from the British the aeroplanes and motors and is British the aeropianes and motors and is now selling them in the United States. In his opinion Judge Hand said that a pat-entee selling his patented article in a for-eign country cannot afterward claim an infringement of the patent in the United States, if the article is brought here un-less a clause appears in the contract prohibiting export to this country.

Bosch Magnetos at Indianapolis

Indianapolis, Ind.—The success of Bosch magnetos at the Victory Sweep-Bosch magnetos at the Victory Sweep-stakes at Indianapolis is another proud record to the credit of the Bosch Com-pany, makers of automobile and aero-plane magnetos. Not only was first, sec-ond, and third place won by Bosch equipped cars, but of the thirty-three cars which started in this race twenty-two of the world's greatest drivers chose Bosch magneto ignition, and it is a matter of official record that there was not a single ignition adjustment of any kind made during the whole race on any of these twenty-two cars.

Curtise Aviation School Opens

This week will mark the opening of the Curtiss Aviation School at Garden City. I., I., under the direction of Roland Rohlfs, test pilot for the Curtiss Engineering Corporation, and Richard H. Depew. until recently a captain in the United States Air Service.

States Air Service.

More than 200 applications have been received from all parts of the United States, as well as Canada, Mexico, Argentine, Cuba and Italy. The first student to enroll in the school is Alberto Chiesa of Miller Inches and Inc

Milan, Italy, who has come to America to receive instruction in flying.

Rohlfs, who has been instructor and test pilot for the Curtiss Company, has had more than 2,000 hours in the air, and during his career as a filer he has flow all the Curiss models—both land and water—including the new three-passenger triplate which was designed especially for war purposes and which has since been modified for peace-time flying, and been considered to peace the flying, and the control of the curis of the curious curis of the curis of the curious curis of the curious curious curis of the curious curi during his career as a flier he has flown

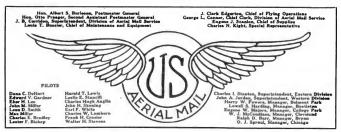
The course to be offered will differ The course to be offered will differ from the methods used by the army. In-stead of the three-months' ground school course, followed by several weeks of actual flight, it is the aim of the instructors actual flight, it is the aim of the instructors to teach the principles governing flight smultaneously with actual flying. The course will include lectures on aerodynamics, theory of flight, construction and repair of aeroplanes and motors. Following the lecture, the student will be howeful to apply this theories. his theories.

his sheories.

The America Trans-Oceanic Company, distributers for New York and Florids, will operate a water-flying school at Post Station at Atlantic City will operate as the Station at Atlantic City will operate and and water schools, as will he Curtiss Fastern Airplane Company, distributers for Pennsylvanii, Maryland and Delaware. The Curtiss Airplane Company of New England, with headquarters at Bos-New E New England, with neadquarters at nos-ton, will operate schools; also the Curtiss Southwest Airplane Company at Tulsa, Okla., and the Curtiss Northwest Air-plane Company at Minneapolis. I. B. Humphreya, distributer for Colorado, will operate a land school, and Sydney Chaplin, brother of the motion picture star, and distributer for southern California and Arizona, will operate schools in California at the Catalina Islands. George W. Browne of Chicago, distributer for the Middle West. the Middle West, will start a school under the direction of Lee Hammond, who conducted experiments for the Navy in flying land machines from the decks of battle-

Major J. E. H. Stevenot has left for the Philippine Islands to open a school. In addition to these, many individuals who saw service during the war are starting schools, and, judging by the amount of interest shown, flying will soon be a more or less commonplace accomplish-

Many schools are also taking up avia-on. The Junior Plattsburg camp will inaugurate a course of instruction in aeronautics and Castle Girls' School at aeronauties and Castle Giris' School at Tarrytown-on-Hudson will offer a course in aeroplane mechanics for girls this sum-mer. The Sheffield Scientific School has a course in military aeronautics and many other universities are following the lead.



New York-Chicago Aerial Mail Started Washington, D. C.—The Air Mail Route between New York and Chicago was inaugurated on July 1, according to an announcement by Second Assistant Postmaster General Praeger, when the Eastern half of the route between New

and Cleveland was linked up with the Western half from Cleveland to Chicago which has been in regular operation since May 15. A fast flight was made today from New

York to Cleveland at the average speed of 110 miles per hour-a distance of 430 miles. A new fast plane left New York at 5:15 a. m. and flew to Bellefonte, Pa., use arest stop, at the rate of 123 miles per hour. Another plane took the mail from there to Cleveland at the rate of 100 miles per hour arriving at 9:30 a., Eastern time. The entire distance be-tween New York and Chicago is about 750 miles. the first stop, at the rate of 123 miles per

Mail can now be sent by aeroplane from New York, leaving there about 5 a. m., and reaching Chicago about 1 p. m. Planes are changed at Bellefonte, Pa. and Cleveland. The air mail arrives in Cleve-Cleveland. In air mail arrives in Cleveland in time to catch the plane leaving there at 9:30 a. m. for a non-stop flight to Chicago. About 12,000 letters a day are taken for Pacific Coast points, and through air mail service from New York to Chicago will advance the delivery of

mail for Scattle, San Francisco, Los Anmail for Seattle, San Francisco, Los Ani-geles and other cities about 24 hours sooner than if sent from New York through by mail. This applies to letters received in New York post office for the 8:40 p. m. train westward.

Air mail from the West for New York and points East is taken on at Chicago and Cleveland. A plane leaves Chicago 2:30 p. m., arriving at Cleveland at 5:30 p. m. in time to connect with the 20th Century Limited, and the mail arrives in New York about 9:00 o'clock the next morning. This gives the business men about three hours more to dispatch mail from Chicago than if sent by train about noon. An aeroplane leaves Cleveland in the morning at 8:30, taking on all air mail from train connections, and the mail arrives in New York about 1:00 p. m., a stop being made at Bellefonte, Pa., to change planes. This also gives the business men a late night service by train to Cleveland connecting with the morning plane at that point for New York and points East, and advancing mail delivery many hours over that by through train

Most of the planes used are remodelled De Haviland fours with Liberty motors. They have a capacity of 400 pounds of mail.

Demonstrations in dropping from aeroplanes in parachutes were given at the

College Park Air Mail Field, Washing-ton, this afternoon by Mr. William Lin-ley and Miss Sylva Boyden, the English ley and MISS Sylva Boyden, the English aviatrix, representing two parachute concerns. The purpose of these demonstrations is to determine their practicability for use in protecting mail pilots in cross country flying in case of fire or other ac-cidents which might make a landing by the plane impossible.

Plaut Merchandise Plane Carries Mail Newark, N. J.—In connection with the aerial delivery service maintained by the L. S. Plaut Co., between Newark, Asbury l'ark and intermediate points, official sanction was obtained for carrying aerial mail for the Post Office Department. Two Whitteman-Lewis planes, one a land and the other a scaplane are used in the delivery service to the coastal resorts.

Large Sales of Surplus Aircraft Material

Large Soles of Surplus Aircraft Material Washington, D. C.—According to an announcement from the Office of the Director of Sales, the sale of surplus war materials for the week ending June 20 amounted to \$274.563.22. The total tales by the War Department from January 1 to June 20 amounted to \$333,712.636.75, representing 79 per cent. of the cost of the original material to the Government.

UNITED STATES POST OFFICE DEPARTMENT

AIR MAIL SERVICE—EASTERN DIVISION Monthly Report of Operation and Maintenance

MAY, 1919

Acreplane No.	Gasoline				Rent. Light. Fuel. Power. Telephone and Water		Pilote	Mechanics and Halpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge		SERVICE AND UNIT COST					
		Crease and	Office Force	Motorcycles, Trucks		Missellanesus						TOTAL.	Callons of Gaseline	Total Time Run	Total Miles Run	Miles Run per Callon of Canoline	Cost per Hour	Cost per
2 4 7 10 11 12 14 15 17 33 38 39 43 71 39344 39365	\$12, 100 4, 58 44, 32 88, 64 91, 26 111, 74, 95, 60 220, 74 109, 20 50, 20 16, 78 75, 53 39, 42 23, 46	\$1.08 .50 5.25 18.12 17.16 14.49 13.771 20.49 7.58 2.00 3.50 13.67 4.61 5.09	\$67 64 67 64 67 64 67 64 67 64 67 64 67 64 26 01 77 64 26 01 77 64 26 01 77 64 26 01 77 64 26 01 77 64 27 64 27 64 27 64	\$52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49 52.49	\$24.81 24.61 24.61 24.61 24.61 24.61 24.61 24.61 24.81 24.81 24.81 24.81 24.81 24.81 24.82	\$83 84 83 00 88 70 88 34 83 84 117 87 105 17 156 77 132 47 80 83 85 99 80 83 93 60 93 83 101 56	\$6 82 2 12 30 21 146 72 103 60 180 23 124 76 287 81 155 54 15 52 30 21 10 07 19 39	\$63.78 63.78 122.74 170.02 118.36 122.47 130.51 150.90 130.62 63.77 63.77 63.77 63.77 63.77 63.77 63.77 63.77 63.77 63.77	\$5 23 7 13 5 23 5 48 105 61 68 72 21 68 42 22 186 38 8 28 156 31 4 83 80 84 4 95	\$67.50 67.50 67.50 66.24 46.24 46.24 46.24 46.24 46.27 72.50 72.50 72.50 72.50 72.50 72.50	\$61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25 61.25	3446 54 393 18 570 14 769 75 772 26 867 95 743 36 1,146 58 967 16 417 9 510 03 556 77 389 99 661 39 516 59 449,83	40 15 137 283 290 362 307 708 371 100 165 55	hr. min. 1 05 20 4 45 23 04 16 08 26 46 19 37 45 49 24 18 2 17	90 25 476 1566 1112 1896 1348 3400 1872 180	2.25 1.67 3.47 5.53 3.83 5.23 4.39 4.80 5.04 1.09	\$411 60 1179 00 120 00 33 00 47 40 32 49 37 80 40 20 223 20 223 20 139 20 325 80 147 00	1. 19 46 46 46 55 33 35 2. 83
otal	\$1,014.14	\$164.66	\$839.39	\$839.85	\$396.98	\$1,557.47	\$1.113.00	\$1.621.97	\$709.11	\$964.94	\$980,00	\$10,201 51	3239	173 32	12744	3.93	\$58.76	\$0.8

Cost per mile, overhead, \$ 31; cost per mile, flying, \$ 17; cost per mile, maintenance. \$ 32.

OTTO PRAEGER, Second Assistant Postmaster General

The Avro "Spider," Type 531

The following spring of April, 1918, saw an entirely different type of machine issue from the Avro works. This was a single-seater "Scout," in which the wing bracing was along quite unusual lines. From the illustrations it will be seen that, instead of the ordinary wing bracing wires or cables, the "Spuler," as this rauged in the form of a Warren truss. In 1917 "Flight" published a series of articles by "Marco Polo," entitled "Wing Bracing and Head Resistance," in which this particular form of wing pracing was dealt with. In this article bracing was dealt with. In this article though the combination of Nicuport Vettough the State of the Combination of Nicuport Vettough the Combination of Nicuport Vettough the Combination of Nicuport Vettough Vettough Combination of Nicuport Vettough Vettou

struis and Warren trous did not appear to give the absolute minimum or resistance, it did have a low resistance, while at the same time having the structural advantage that the distance beture, and that therefore the arrangement might be found to be worth trying. This appears to be what the Avro designer has done. The "Spider" was said to be extremely moneurevable and light on the controls, and the accompanying a good turn of speed—120 M.P.H. at ground level with a 130-M.P. Clerget engine is not bad—while the climb was also satisfactory. The pilot was so placed that his eyes were on a level with a 130-M.P. Clerget engine is not bad—while the climb was also satisfactory. The pilot was so placed that his eyes were on a level with a 130-M.P. Clerget engine is not bad—while the climb was also satisfactory. The pilot was so placed that his eyes were on a level with the grant of the bottom plane gave a minimum of obstruction to downward visibility. The "Spider" might conceivably make a smaller engine, since the fuel bill for a motor of 130 H.P. would probably be more than the majority of owners would care to spend. However, as the machine is light there does not appear to be any reason why, in a slightly modified or the real-own, say, an engine of 88-H.E.

The Avro "Manchesters"

The success which was attained with the carlier model twin-engined machines, from the point of view of performance, encouraged the Avro firm to get out a design for a modern machine of this type, to be an improvement upon previous models chiefly as regards its engines, which were are now speaking of the earlier part of 1918—beginning to go into production, and which had an extraordinary power/weight raito. With such engines available a very good period to the state of the state of



The Avro Type 530 two-seater fitted with a 200 H.P. Sunbeam Arab Engine

regards the engine housings. As in the previous Arvo twins, the pilot occupies the middle sear, with one gunner in front and one in the rear. A feature which will scarcely escape the notice of readers is the unusual arrangement whereby the alterons are balanced, Instead of the ordinary small forward search of the property of the alterons are balanced, Instead of the ordinary small forward seen on large machines, the "Manchesters" have a surjuster on large machines, the "Manchesters" have a surjuster plane mounted on two short struts from the main alteron, and placed slightly ahead of it, to as to produce a balancing effect. The advantages expected from this arrange-balancing effect. The advantages expected from this arrange type doing it in this fashion the twist of the alteron, is avoided. In some recent German machines a similar arrangement has been tried, but differing in that the it is at the Avois is below the main plane intered of above

More recently the Dragonfly engines have been obtained, and the "Manchester" Mark I tried with them as originally intended, with good results. The "Manchester" II is being litted with a cabin for passenger and mail carrying, and probably, therefore, more may be heard of this machine later on.

The Seaplane, Type 504L

Quite recently (Pebruary, 1919, in fact) a further development of the famous 504 type has taken place. This takes the form of a tractor seaplane with 130-H.P. Clerget engine, very similar to the standard Avro 590 in general arrangement, estimate the uncarriage, wold is of the twin-float type. This machine uncarriage, wold is of the twin-float type. This machine the contraction of the twin-float type. This machine relating to this machine, are the table of performances, relating to this machine, are the calculated figures, and we are informed that the actual tests have given even before trendts. Thus the calculated speed the machine actually does 90 M. P. H. The machine, which is fitted with dual controls, can be looped, spun, side-slipped, stalled, etc., just like the standard land machines. The 594L will also be arranged as a three-seater, with single controls and the pilot in front. The sinservee which was used for the machine action from the sinservee which was used for the machine action from the machine will take all rotaries up to 150 H.P. and also the A.B.C. Was



One of the Avro Type 504J Training Aeroplanes with a 100 H.P. Gnome Monosoupape Engine, which was flown in the United States last sums



NAVAL and MILITARY AEDONAUTICS A



Army Surgeons in Long Flight Washington, D. C.—A recent successful flight by Army surgeons from Florida to Washington, a distance of 1,360 miles, was made in 18½ hours actual flying. This was the longest flight made by officers of the medical corps, although a medical officer had previously made a longer trip as a passenger.

The purpose of the trip was to stim-The purpose of the trip was to stimulate interest among officers of the medical department in flying. Major S. M. Strong, post surgeon of Carlstrom and Dorr aviation fields, Florida, was in charge of the three airships which made the flight from Florida to Washington. Major Strong is working on an aerial ambulance and is hopeful of perfecting a machine of this type, for real war work, with a capacity of from 2 to 15 patients.

There were two men in each of the three ships piloted from Florida to Washington. Major Strong, with Lt. R. W. Brown, acting as adjutant of the group, were in the first aeroplane; Capt. John H. Timherman, flight surgeon and his-torian of the trip, and Lt. John Langley, navigating officer, in the second, and Lt. Fred Austin, in general charge of the ships and supplies, and Sergeant H. S. Rasch, mechanic, in the third. The machines were of the Curtiss type

with Hispano-Suiza motors. As flight surgeon, Capt. Timberman made a study of the physical and mental condition of the men making the flight, including expects to make the return trip to Florida their blood pressure and pulse. The party early next week.

Capt. Kindley, Who Downed 12 Planes, Returns on Transport Tiger Captain F. E. Kindley, of Gravette,

Ark., who has twelve enemy planes to his credit, arrived at New York on June 27 Tempor Tigor. He has the DS C. Crimpper Tigor. He has the DS C. Crimpper Tigor. He has the DS C. Crimpper Tigor. He has the Company of the Distinguished Flying Cross from Great Britain, as well as the Croix de Guerre from France. The captain was with the 141st Acro Squadron, of which he had command on the transport. He left the mand on the transport. He left the United States on September 16, 1917, as a cadet flyer.

Air Service Instruction for High School Students

Washington, D. C .- The fact that forty high school graduates just completing their work at New York City high schools have enlisted in the Air Service in preference to seeking instruction at technical schools has called the attention of Air Service officers to an excellent field for obtaining recruits of the highest order.

Accordingly an energetic campaign is being prepared to present the opportuni-ties for higher education and technical aeronautical instruction to high school graduates in all parts of the country. A number of aviation officers will be detailed for this work and Educational Boards will be requested to include such an officer as a speaker in the graduation program of public schools.

Bombardment Squadron Ordered to Border

Washington, D. C.—The 96th Aero Squadron, the first American bombardment squadron to see service on the Western front, has entrained for the Mexican border for observation duty on this side of the line. Capt. Cecil G. Sellers, D. S. C., formerly commander of the 96th is in command.

Lieut. Col. H. B. Hersey Discharged from Air Service

Washington, D. C .- Lieut, Col. H. B. Hersey, formerly commanding officer of the Army Balloon School at Fort Omaha. Nebraska, later of the Army Balloon School in France and finally in the Administrative Dept. of the Balloon Di-vision at Washington, has, at his own request been honorably discharged from the service. Colonel Hersey will assume the office of District Forecaster, Weather Service, Milwaukee, Wisc.

Air Service Officers Recommended for Regular Army Commissions

Washington, D. C .- According to an official statement, Class III officers (those who have requested commissions regular army) desiring service in the Air Service total 2,297, and recommendations have been made on behalf of 2,297 officers

Single Wing Insignia to Be Discarded

Washington, D. C .- The Advisory Board of the Air Service has recom-Board of the Air Service has recom-mended the use of the double wing in-signia for all officers who participate in regular and frequent flights. Distinctive insignia for the following ratings are suggested: Aerial gunner, aeroplane ob-server; aerial bomber and balloon obser-The question of ratings and insignia for dirigible pilots is also being considered.

Distinguished Service Cross Awarded

The Commander-in-Chief, in the name of the President, has awarded the Dis-tinguished Service Cross to the following officer for the act of extraordinary heroism set forth after his name:



The Vickers commercial type "Vimy" machina equipped with twa Rolls-Royca 378 M.P. angines. Two pilots are carried in the cackpit places high in the nose and the cabin has a seating capacity for 10 passengers in separate arm chairs. Fuel is carried for five hours; speed, 110 M.P.H.

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FIRST LEUTENANT WILLIAM P. ER. WIN. First Arec Squadron, (Pilet). For the Win. First Arec Squadron, (Pilet). For the Win. First Arec Squadron, (Pilet). For the Win. First Arec Squadron, (Pilet). Against the self-constant Even in swarded an Oak Leaf Chierer to be swarded in Oak Leaf Chierer to constitute the oak Leaf Committee of the Chierer to be swarded in Oak Leaf Chierer to constitute the oak Leaf Chierer the oak Leaf Chierer to constitute the oak Leaf Chierer to const troops.

Home address: W. A. Erwin, (Father), 814
Fine Arta Bidg., Chicago, Ill.

Army Appropriation Provides \$3,260,-000 for Purchase of Wright-Martin Plant

Washington, D. C .- The \$3,260,000 appropriation for the purchase of the Wright-Martin factory at Dayton and the 1,586 acres of property surrounding it survived all attacks in Congress and remains a part of the appropriation bill, which, from all indications, will be passed in the very near future.

Twelfth Aero Squadron to be Ordered to Border

Washington, D. C.—Orders have been requested of General Menoher for the transportation of the famous Twelfth Active as the Mexican border. The conduty on the Mexican border. The considerations which led to the ordering of this unit, which has just arrived from this unit, which has just arrived from overseas for discharge, are that since the work required would be that of an ob-servation squadron and that the better plan on account of the rapid demobiliza-tion in the United States and the need of thoroughly trained personnel was to send an arriving overseas squadron immedi-ately and then relieve it as soon as com-petent personnel could be mustered from the training schools throughout the United States

The Twelfth is in such splendid state of organization that they can operate immediately and the personnel is thoroughly experienced, having served throughout the Chateau-Thierry, Saint Mihiel and Argonne offensives.

Major Reed M. Chambers, an American ace, now commanding the Ninety-fourth Aero Squadron, which was the old squadron of Rickenbacker, made application to be assigned to the expedition in any capacity should it be necessary to utilize the services of a pursuit aviator. At present, however, it is believed that it will only be necessary to use observation planes, which can also be used for firing on the infantry on the ground.

Americana Enlist in Air Service Here to Aid Home Industry

South Americans are flocking into the air service of the United States Army as a means of acquiring the necessary training for opening an extensive aero industry upon completion of their term of service. Since the beginning of the publicity campaign of the recruiting service a week ago six South Americans have been enlisted at one recruiting office in New York City alone.

Señor Bernardo Plata of Bogota, Colombia, who was one of the recent retions in South America that have aero-plane facilities—Brazil, Argentina and Chili—and there is now under consideration in Brazil an aero mail route serving Colombia and neighboring states. If tremendous stride in the progress of South American aviation, but there is no reason why Colombia should not be served by her own sons rather than be com-pelled to depend on outside interests for development.

First Balloon Company to Serve at Front Returns. Washington, With The Second Balloon Company, which the Patria Prought back recently, was the first American are unit to see service on the western front. Inviting entered the fighting some manded by Capt. 1. I. Konig, of St. Louis, was attacked eighteen times and lost five leadings, but suffered in Casandities.

Recent Naval Ordera

Licutenant (junior grade) Rodney B. Starr, to naval air station, San Diego, commandant Twelfth naval district.

Lieutenant (junior grade) Guy McKughlin, to naval air station, San Diego.

Lieutenant Earl R. Holmes, to naval station, Auscostia, D. C.

Lieutenant (junior grade) Francis R. McDon-nell, to duty, naval air station, Chatham, Mass.

Lieutenant (junior grade) Harold J. Brown, to naval air station, Hampton Roads, Va.

Ensign Jack B. Bradig, to duty, naval air sta-tion, San Diego, Cal.

Ensign Carlyle S. Fliedner, to duly, naval air station, Far Rockiway, 1., 1.

Ensign Edward M. Tileston, to duty, naval air ation, Cape May, N. J.

Ensign Byron J. Connell, to duty, naval air atton, Rockaway, L. I. Ensign Alford J. Williams, Jt., to duty, naval air station, Hampton Roads.

Special Orders, 143 to 149, Inclusive

Col. Milton F. Davis is relieved from his present duty in the office of the Director of Air Service, and from active duty to take effect June 30, 1919, and will then proceed to his home.

First Lieut. Philip De Riblet will proceed to Washington, D. C., and report to the Director of Air Service.

Second Lieut. Duncan L. MacIntyre is re-lieved from duty at U. S. A. General Hospital No. 10, Boston, Mass., and will proceed Colonia, N. J., and report in person to U. S. A. Heneral Hospital No. 3 for duty.

Second Lieut. Gavin D. Crandall will proceed to Harelhurst Field, Mineola, Long Island, N. Y., and report in person to the commanding officer for assignment to duly with the 4th Aero

Second Lieut. Bennett E. Meyers will proceed to Love Field, Dallas, Texas.

First Lieut. Christopher O. Anderson is re-lieved from his present duties and will proceed to Washington, D. C., and report to the Di-rector of Furchase, Storage and Traffic for as-segment to duty in the Office of the Director of Finance.

The following named officers will proceed from Rockwell Field to Mather Field, Sacramento, Cal, for duty: First Lieut. Edward V. Wales, First Lieut. Robert Kauch, Second Lieuts. Wil-lam Goldsborough, Emil C. Kiel, Augustua Good-rich, Eugene C. Balten, Robert O. Weede.

The appointment on May 2, 1919, of Second Levit. Charles N. Fitts, for the period of the custing energency by the commanding general, A. E. P., France, as announced in paragraph 28, S. O. No. 122, A. E. F., France, May 2, 1919, to the grade of first fieutenant, Arr Service, with tank from May 2, 1919, is confirmed.

The following named officers will proceed to Hazelhurst Field, Minreola, Long Island, N. Y., and report in person to the commanding officer for assignment to duty with the 4th Aero Squad-ron: Second Lieut Earle H. Manzelman, Sec-ond Lieut, Charles Y. Bannil.

Paragraph 26, A. E. F. No. 142-O, W. D. June 18, 1919, directing First Lieut, Engene II Baikwalak, to proceed from Hazelharst Field Miscola, Long Island, N. Y., to avation genera supply depot, San Antonio, Tex., is revoked.

Second Lieut. Howard K. Ramev will proceed (Continued on page 866)



Commander A. C. Read, U. S. N., here of the first trans-Atlantic flight, about to make a logut in a Breguet Bember, with the famous French pilot, Lieutenant Roget, at Villacoublay, France



FOREIGN NEWS



Briatol Fighter First Plane to Craas Pyrenees Inta Spain

Betato Fighter First Plane to Crass Pyreness Ints Spain London, Engined—Major Paper and his abserve, Major Cre, careed for themselves the distriction of being the first British avistors to enter the control of the co

Grand Prix de l'Avenir for Aerial Tour Through Franca Totals

Grand Frits de l'Avenir fer Arrial Taur Through France Testal

100,000 France

Under the fitte of the "Grand Pric de Patroren", a trial la being
of the programme of the programme of the programme of the order of demonstrates per presentable, or arrial for tuning and transport
purpose. It will be held under P.A.I. rules, with the patronage of the
nationality using machines of Prects of rules of the patronage of the
nationality using machines of Prects or Allied constrained. It is also the
in six rugas. The first will be from Pasis to Aspert, to Rosen, Havre,
Deswille and Danard; the second from Augurt to Berdena by Komomissis rugas. The first will be from Pasis to Aspert, to Rosen, Havre,
Deswille and Danard; the second from Augurt to Berdena by Komosilles to Lyon rot Montpiller; and the fifth from Lyon to Mett ris
errain carrors on this course, details of which will be arranged later.
The centrals will be often between 7 a. m. and 8 p. m., but no maParis on Angues to all the current of the control of the conParis on Angues 2, and all machines on sus strive in Paris by the closing
Retries must be made to the Areo Club of France before 6 p. m.
on June 30, the fee being 1,000 rance, which is returnable on the
The prices amount to 100,000 france, and will be divided into
the process of the control of the control of the conThe greezed classing, while the other section will be divided into
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amount of fuel and lubricant consumed. When this weight has been decided upon, it will be painted on the fuscinge or radder of the decided upon, it wis the posterior machine.

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machine will be stamped and strated before the start, and space parts may be sealed also, but they will have to be carried on board.

At least one passenger must be carried, passengers must be over 18 years of age, and weigh at least 65 kilogs.

Bristol Seaut Fast Climber

Bristel Scaut Fast Clubber

During recent tests at Farnbround with the "Bristel" Scout, type F, was fitted with a 131 hp. Common "Mircoury" congre, elimbed a height of 10,000 feet in 5 minuted 30 seconds, and at that backput statistical of 10,000 feet in 5 minuted 30 seconds, and at that backput statistical in 5 seconds. East of control is one of the outstanding features of this contractional point of view is that the allerons are fitted in the upon the contractional point of view is that the allerons are fitted in the upon the contractional point of view is that the allerons are fitted in the upon the contraction of the second of of the se

The Austin "Whippet" Aeroplane

For some time the designing staff and the experimental shops of the Austin Motor Co., of England, have been concentrated on the design and manufacture of a single-scater acroplane which it is aboped will take the place of the motorcycle for demobolized and undemobolized pilots. The price of the machine has been fixed tentatively at about

take the place of the motorcycle for demoloclared and undemolocibules 12,000.

It has been the object of the degingers to provide for reliability in the control of the place of the degingers to provide for reliability in running cost and small housing accommodation. The Whapper's has prevent making and the control of the control of the provided that the control of the provided in All fittings are made of a special hapt-means and extra that solpted in All fittings are made of a special hapt-means are certified with the control of the control



The Austin 45 H.P. "Whippet" biplane which has a speed range of 30-98 miles per hour

(Continued from page 844)
soon to attempt the over-seas flight. Officially, New Jersey
will be glad to offer any of her facilities in co-operation with

the associations endeavoring to arrange for the event, and you

the associations endemoring to arrange for the event, and you have full permission to permit the invasion. Wigned) Walter E. Edge, Governor. Subsequently Mr. Ahan R. Hawley, Major Thomas S. Baldwin, U. S. Army dirigible expert, and Mr. Henry Woodhouse vasied Cape May Naval Air, Station to ascertain whether it afforded the necessary facilities for receiving and mooring Airport for the purpose. It was found that the grounds available at Cape May were not as large or as suitable as the Altanic City Airport and that practically all the necessary equipment for handling the large dirigible would have to be provided, as the Cape May station was only equipped to handle small Naval dirigibles. General Charlton was notified to this effect in a letter dated May 22, which he action segred was coming to the United States to inspect available grounds.

From: British Air Attaché, Washington, D. C. To: Secretary, Acro Club of America, 297 Madison Ave., New York, N. Y. Re: British dirigible being handled at Cape May Naval Station

Dear Mr. Secretary: I am in receipt of your letter of May 23 in which you advise me that, after due inspection, Cape May Naval Station, handling the airship R-34; that Atlantic City remains the most

convenient spot for their receiving; and that you are proceed-ing with your general arrangements at the latter place ac-

cordingly.

In reply I have to state that a party consisting of two officers and a small number of mechanics sailed from England
per S.S. Advancia on the 28th intent for the purpose of final
per per S. Harding on the 18th intent for the purpose of final
this party I will send them, or conduct them personally, to
Altanic City, where to place them intouch with the officials of
the 4ero Club who are concerned in the matter. I may add
that upon the report of this Committee will depend whether
or not Albanic City will fulfill the requirements of the terminal for the voyage, and I have no doubt mayet that everyminal for the voyage, and I have no doubt mayet that everyminal for the voyage, and I have no doubt mayet that everyminal for the voyage, and I have no doubt mayet that everyminal for the voyage, and I have no doubt mayet that everything will be satisfactory.

Thanking you for your regards and wishes, and hoping to be able to pay another visit ere long to Atlantic City, believe

(Signed) L. Charlton, Brig.-Gen., Air Attaché.

A meeting was then arranged, consisting of Messrs. Henry Woodhouse, Albert T. Bell, President, and Harry B. Cook, Secretary of the Atlantic City Aero Club, and W. W. Young, to mobilize the 700,00 cubic feet of hydrogen needed to inflate the dirigible. The rest of the equipment required had already been mobilized and everything was ready for the dirigible, excepting the hydrogen.

excepting the hydrogen.

The Committee found that there were 46 hydrogen plants in the United States, having a capacity of from 8,000 to 60,000 cubic feet daily production capacity. The plants located within a radius of 75 miles of the Atlantic City Airport could supply immediately 3,000 hydrogen cylinders, each cylinder holding 198 cubic feet of hydrogen at a pressure of 1,800 pounds per square foot. They could supply the balance within a week

The Committee decided that it would be best to get these hydrogen plants and install them at the Atlantic City Airport hydrogen plants and install them at the Atlantic City Airport as a permanent proposition, and a representative was appointed to go to Washington to get the sanction of the Army Air Service. Mr. G. W. Walton, a friend of a member of Air Service, who was a called, which was attended by Army and Navy authorities and General Charlton, the British Air Attache. At the meeting the representative of the Navy Air Air Attache. At the meeting the representative of the Navy the dirigible which was expected by General Charlton. It was decided that the Navy would supply the hydrogen, the gasoline, oil and morning facilities at one of the Naval stations. Subsequently it was decided to use the Army Aviations. Subsequently it was decided to use the Army Aviations. Subsequently it was decided to use the Army Aviations. Subsequently it was decided to use the Army Aviations. Subsequently it was decided to use the Army Aviation Field.

R-34 handled at the Army Aviation Field.

These arrangements were thoroughly satisfactory to the

These arrangements were thoroughly satisfactory to the committee of the Aero Club of America and Aerial League of America, because it was realized that, besides the reasons already given, it would be better to have the event take place under the auspices of the Army and Navy for several reasons, and especially so as to have trained personnel under military discipline for the handling of the ship on the grounds, to avoid possible mishaps.

(Signed) Augustus Post, Secretary.

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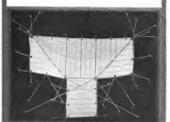
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IRPLANE in hangar. Note room for camp beda at each side under top plane. Front wall AIRPLANE in hangar. Note room to some policy at each side under top plane. Front wall closes on cable at top and lashes in center. Non-detachable pege at bottom make it wind and rain proof.



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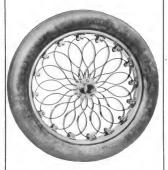
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A.W.O.L. Prisoner Returns to Camp in Aeroplane

Stamford, Conn.-Charles 'Lowden of Stamford, who is in custody here for having overstayed a furlough from Mineola, is destined, according to police announcement, to be the first prisoner to travel

Weather permitting, he is to be trans-ported from the city lock-up here to the guardhouse at Mineola to-morrow in an aeroplane. The young man enlisted re-cently and crossed Long Island Sound in the aerial ferry established to carry recruits from Stamford to Mineola.

Uts and Swander Now Vice-Presidents of Standard Parts Co.

Dan C. Swander and John G. Utz have Dan C. Swander and John G. Utz have heen elected vice-presidents of the Stand-ard Parts Co. Mr. Swander will continue as supervisor of sales and Mr. Utz as su-pervisor of engineering. Both men have tion. Mr. Utz was formerly director of engineering of the Perfection Spring Co. Mr. Swander previously was eastern sales manager of the Firestone Tire & Rub-ber Co.

Personal Pars

Julian S. Friede, recently released from the British Royal Flying Corps, has joined the engineering staff of the Haynes Auto-mobile Co. Previous to his aviation service he was on the engineering staff of the

ice he was on the engineering start of the Paige Detroit Motor Co. Edward A. Hefferman, recently re-turned from the naval aviation service, will have charge of the office of the Ahl-berg Bearing Co., recently opened in the City Bank Building, Kansas City, Mo.

Doehler Employees Form Benefit Associations

Brooklyn, N. Y .-- The employees of the Doehler Die-Casting Co. have formed a mutual benefit association providing compensation during illness and death benefits. A house organ known as Doehler Topics made its first appearance with the June issue.

A New Canvas Hangar on the Market Canvas hangars built to house eight aeroplanes have been successfully de-signed and put on the market by the Henrix-Luebbert Mfg, Company of San Francisco, California. One of these hangars erected at Langley Field, Va., at one time withstood a 90 mile gale without being disturbed in the least. It is a remarkable fact that during this gale other hangars built of wood and corrugated iron were

damaged to some extent.

A large hangar is now being erected on board a barge to house a flying boat and it is expected that there will be no trouble in keeping the hangar in good order. Hangars have also been designed for dirigibles and observation balloons and the company making them is prepared to undertake the design of a special hangar suitable for free balloons.

All of the Henrix-Luebbert hangars are erected without the use of manila or any other kind of rope, but steel cables are employed throughout, this patented prin-ciple being employed because of the difficulty in keeping a canvas hangar rigid when ropes are used which might stretch or shrink according to the weather.

During the War, the Henrix-Luebbert Company employed some 27 blind men and women to do some work in the con-

struction and is now giving employment to returned service men including those who have met with accidents which do not handicap them in the careful performance of their work in this line.

Personal Pars

General George W. Goethals has an-nounced that Mr. C. S. Jennison has been George W. Goethals & Company, Inc., consulting engineers, New York City.

Electrical Show to Be Resumed

The Electrical Exposition and Motor Show will open at the Grand Central Palace, New York City, on September 24th. Forty per cent of the space has been allotted to exhibitors. This will be the first show since 1917, the 1918 exposi-tion having been omitted because of our entry in the war.

Automobile Tires Advertised and

Houston, Texas,—The Aerial Tire and Rubber Co. of this city, distributors of automobile tires, are using an aeroplane for the sale, advertising, and in some cases, the delivery of motor car tires.

Personal Pars

Mr. J. L. Justice, who for the past three years has been associated with the Max-well Motor Company of Detroit as zone supervisor, has left the Maxwell Company and taken a position as general sales man-ager of the National Wire Wheel Works, Inc. Mr. Justice will have his offices in the Book Building at Detroit, Michigan, in order to keep in constant touch with all the car manufacturers.

WHY "BELLANCA"?

WHY "ANZANI" ENGINE?

Y "TWO-SEATER"?

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(Continued from page 859) to Cooperstown, N. Y., and report to military hospital for treatment.

Second Lieut. William S. Heltzen is trans-ferred with the necessary attendants to Walter Reed General Hospital, Takoma Park, D. C., for

Capt. Boyd F. Briggs will proceed to Hazel-hurst Field, Long Island, N. V., for duty.

First Lieut. Hugh A. Bivins will proceed to Americus, Ga., and report to aviation general supply depot for duty.

Second Lieut, John V. Hart will proceed to Hazelburgt Field, Mincola, Long Island, N. Y., and report in person to the commanding officer for assignment to dity with the 4th Aero Saundron.

Capt. Charles W. Babcock will proceed to Fairfield, Ohio, and report in person to the commanding officer, Wilbur Wright Air Service depot, for duty.

First Lieut. Henry V. Bell, unassigned, is transferred with the necessary attendants to U. S. A. General Hospital No. 43, Hampton, Va., for further treatment.

First Lieut. Bruce N. Martin, F. A. (attached to Air Service), will proceed to Hazelburst Field, Mincola, Long Island, N. Y., for duty.

Second Lieut. Franklin A. Plummer will pro-ceed to Camp Pike, Ark.

Capt. Samuel Katzman will proceed without delay to New York City and report to the United States Army recruiting officer, 461 Eighth Avenue, for duty in connection with the recruiting service.

The following named second lieutenants will proceed to Belleville, Ill., and report to Scott Field for duty: Talcott P. Smith, Frank M.

Second Lieut, George H. McKay will proceed to Mincola, Long Island, N. Y., and report to the commanding officer Hazelhurst Field for assignment to duty with the Jd Aero Squadron. First Lieut. Donald C. Bennett is announced as on duty requiring him to participate regularly and frequently in aerial flights from May 30, 1916, to July 31, 1918.

First Lieuts. Charles H. Thalman and Joseph B. Jinkra will proceed to San Antonio, Tex., and

report in person to the commanding officer avia-

First Lieut. Kenneth M. Foote will proceed Dallas, Tex., and report to aviation repair to Dallas, Tex. depot for duty.

The rating of Col. Henry H. Arnold, junior military awater, as military awater, to date from May 20th, 1919, is announced. The rating of Lieut, Col. Barton K. Yonnt, junior military aviator, to date from June 3, 1919, is announced.

Capt. Joseph M. Dawson will proceed to Middletown, Pa., and report to aviation general supply depot at that place for duty.

The rating of Maj. Dana H. Crissy, as junior military aviator, to date from May 20, 1919, is announced.

The appointment on May 8, 1919, of First Lieut. Eugene L. Sullivan, for the period of the existing energency, by the commanding general, France, as announced in par. 6, No. 128-A, E. F., France, May 8, 1919, to the grade of captain, Air Service, with rank from May 8th, 1919, is confirmed.

The following named officers will proceed from office district manager Air Service Finance, But-falo, N. Y., to Detroit, Mich., and report in person to the commanding officer Aviation Gen-ral Supply Depot for the purpose of discharge: Second Lieut. Charles S. Danielson, Second Lieut. Paul W.

The following named nfficers will proceed to Mather Field, Sacramento, Cal., and report in person in the commanding officer for duty: First Lieut, John P. Van Zandt, Second Lieut, Daniel L Dargue, Second Lieut, Carlyle H. Ridenour.

Second Lieut. William R. Sweeley will pro-ceed to Rockwell Field, San Diego, Cal., and re-port in person to the commanding officer for as-signment to duty with the 2d Aero Squadron.

Second Lieut. John W. Powell will proceed to Montgomery, Ala., and report to aviation re-pair depot for duty.

First Lieut. Allan S. Willis will proceed to Fort Bliss, Tex., and report in person to the commanding officer of that post, and by letter to the department Air Service Office for duty. Second Licut. Morris L. Tucker will proceed to Scott Field, Belleville, Ill., for duty.

Capt, Cecil G. Sellers will proceed to Colubus, N. M., and report upon arrival, by letter, to the department Air Service officer, Southern Department, for duty.

Second Lieut. Henry H. Sprague will proceed to Hazelhurst Field, Mincola, Long Island, N. Y., and report in person to the commanding of ficer for assignment to duty with the 4th Art Squadron.

Second Lieut. Charles G. Brenneman will p ceed to Middletown, Pa., and will report aviation geoeral supply depot for duty.

Second Lieut. Marion L. Elliott will proceed Harelburst Field, Mineola, Long Island, N. , and report in person to the commandial ficer for assignment to duty with the 4th Arm

Second Lieut. Clifford Elleman will proceed o aviation general supply depot, Richmond, Va-or duty.

Second Lieut, Percy O. Brewer, Air Servict will proceed to Camp Normoyle, Text, and review of the Camp Normoyle, Text, and review of the Camp Normoyle, Text, and review of the Camp Normoyle, and the Camp No

First Lieut. James L. Rochford will proceed in San Antonio, Tex., and report to aviation gen-eral supply depot for duty.

Second Lieut. Hiram W. Sheridan will proceed to Mincola, Long Island, N. Y., and will report in person to the commanding officer Harselhurst Field, for duty with the 3d Aero Squad-

By direction of the President, Lient. Col. D. M. Cheston, ir., is honorably discharged as lientenant colonel, United States Army, only, to take effect this date.

By direction of the President, Lieut Col. Mil-ton F. Davis (hentenant colonel, U. S. A. re-tired) is honorably discharged as colonel, Ast Service only, to take effect June 30, 1919.

Second Lieut. Floyd B. Meisenheimer will proceed to Belleville, Ill., and will report to Scott Field for duty.

First Lieut. Robert S. Honston is announced as on duty requiring him to participate regularly and frequently in aerial flights from January, 11, 1918.



Vol. 9, No. 19

JULY 21, 1919

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VOL. IX

NEW YORK, JULY 21, 1919

NO. 19

AMERICA TO ENGLAND IN SEVENTY-FIVE HOURS

ALCULATING by New York time right through, the R-34 started eastward over the Atlantic Ocean at midnight of Wednesday; sailed across the Irish coast in the mid-evening of our Saturday; landed at Pulham, a hundred miles northeast of London, well before the dawn of our

To realize the marvel of this performance the exact figures of time elapsed are not needed. Hours and minutes make a statistical record. The R-34 has, in large terms, prepared the way for such a revolution in methods and means of travel as will be quite sure to change completely the relations of land to land, people to people, the world over. So the fourth crossing of the ocean by aircraft becomes the most notable in the series. It marks a close approach to the realization of an old, old dream of man; it goes down as a memorable triumph of mind, heart, courage and imagination.

To comment thus glowingly on the feat of the R-34 and its crew is to shade not at all the earlier transatlantic voyages on the air trail. Pioneer honors remain yet with the American NC-4 and its conductors. For audacity and speed the palm may long be held by the British flyers Alcock and Brown. The note of advance in the case of the great dirigible which has just completed its round trip is sounded over the detail of carrying capacity. For how long or how short a moment we cannot tell, the R-34 brings nearest to a practical basis the matter of establishing a literal airline traffic between con-

Commenting on his eastward trip, Major G. H. Scott, commander of the R-34, said:

"We estimated we would make the return trip from America in from seventy to eighty hours. We made it in seventy-five. When we left Mineola we had a strong wind behind us, and we covered the first 800 miles in about eight hours.

"When we circled over New York we could plainly see the crowds in Broadway waving to us as we passed, but we could not hear them because of the noise of the engines.

"South of Newfoundland we encountered head winds and our progress from then on was slower. We traveled at an average height of from 3,000 to 5,000 feet and found much ow clouds and fog. Once we saw nothing but fog for twentyfour hours.

"We struck Ireland at Clifden and made good progress from there, although our steering engine broke down Satur-day morning. We started with 4,900 gallons of gasoline and had 1,000 left.

"We are naturally pleased with the trip, all of us. I expect important changes in the size and speed of future airships, big ships that will travel seventy to eighty miles an hour and powerful enough to crawl through anything."

Colonel W. N. Hensley, Jr., the United States Army observer on board, said:

"This has been a great trip. We were lost one whole day because the fog was so thick we could not get a shot at the sun, moon, stars or horizon. We passed over the Isle of Man about three o'clock this morning and then, mounting above the clouds, witnessed a most beautiful sight. Above was the bright moon; below, soft, fleecy clouds, touched with all the colors of the rainbow, and, far down below, the deep blue of the sea.

"We soon passed over Liverpool and then other cities and towns and here we are. We suffered no hardships and no inconveniences except that we had no hot water for shaving. Our eggs were cooked in the exhaust of the engines, and we had plenty of other good food and coffee, tea and cocoa to drink. No one suffered from airsickness, and while the sea below was tossed by a forty mile gale, we were moving along in comfort on an even keel.

"Regular airship service between Europe and America is bound to come, and soon.

The aeronautic experts assembled at the Atlantic City Airport were enthusiastic over the successful demonstration of the dirigible in its return trip. Mr. Henry Woodhouse, Chairman of the Dirigible Committee of the Aero Club of America and Vice-President, Aerial League of America, who had a prominent part in arranging to bring the R-34 to the United States and inspected the airship while it was at the Roosevelt Field, said:

"The successful return trip of the British dirigible R-34 completes this epoch making demonstration of the fact that airships are ready to operate as fast carriers of mail, express and passengers.

"Especially significant is the fact that the total time elapsed since it left East Fortune, Scotland, and including the stop of the R-34 at the Roosevelt Field, Mineola, only amounts to the time required for a ship of the sea to cross the Atlantic one way.

"For this reason this cruise, like the transatlantic flights of the NC-4 and Captain Alcock and Lieutenant Brown in the Vickers 'Vimy' are in every way as great achievements as the sailing vessel 'Santa Maria' in 1492 and the crossing of the first steamship, the 'Savannah,' in 1819.

"They are the first aircraft to cross the Atlantic in differ-ent ways and have opened the way for other aircraft to follow.

"The aircraft used for crossing the Atlantic have all been war craft with only minor changes. In these first trips the airmen have had to face difficulties due to lack of meteorologic data. With improved aircraft and the data accumulated in these first transatlantic flights, the crossing of the Atlantic will not only be easier, but even the stupendous records already made will be greatly improved, and permanent aerial lines for the transportation of mail and passengers will follow."

FIFTEEN GREAT AERIAL CONTESTS WITH CLOSE TO \$1,000,000 IN PRIZES

F IFTEEN great aerial contests to come are announced by Mr. Henry Woodhouse, vice-president of the Aerial League of America.

The marvellous accomplishments of aviators during the past two months are to be followed by still greater achievements, Mr. Woodhouse states: The record of Captain Alcock and Lientenain Brown in flying across the Atlantic in 16 hours, and the record of the French Lieutenain Casale, who flew up to over \$2,000 feet, may not be capable of much important to be done and proper incentive is being given to aviators to be done and proper incentive is being given to aviators to

Among the important events being organized which are to be held under the rules of the International Aeronautic Federation are:

- (1) The Aerial League of America's Pioneer Aeroplane Tours, which are to start in the United States, then each to Canada, Central and South America and other countries, (2) The Aviation Competition being organized by the Aero Club of France, for which the President of the Club, Henry Deutsch de la Meurthe, has given \$400,000 at
- . (3) The \$25,000 prizes offered by Raymond Ortig for the first flight from New York to Paris.
- (4) The \$50,000 prize offered by Thomas H. Ince for the first trans-Pacific flight.
- (5) The \$60,000 Echo de Paris prizes for a 2,500 miles circuit race.
 (6) The 100,000 francs prizes offered by the French paper
- (6) The 100,000 francs prizes offered by the French paper L'Avenir for cross country contests.
 (7) The \$50,000 prize to the first Australian pilot who
- (8) The \$32,400 prize for the Portuguese or Brazilian
- aviator who flies from Portugal to Brazil.
- (9) The International Marine Flying Trophy Race, for best speed over a distance of 200 miles, to be held in England in September, for which a prize of \$5,000 is offered to the winner.
- (10) The \$5,000 prize offered by John McK. Bowman, for a race from Toronto to New York.

- (11) The Intercollegiate Aeroplane Contests to be held at Atlantic City this summer for prizes offered by the Aero Club of America under the terms of the will of Mr. Samuel Valentine.
- (12) The contests for National and International Aerial Shooting Championships.
- (13) Seventeen entries and \$10,000 in cash prizes and trophies are affredly assured for the aeroplane flights from Toronto to New York which are to feature the Canadian National Exposition to be opened by the Prince of Wales on August 25, it was announced tonight.
- So far all entries for the Toronto-New York race are from the United States, but twelve Canadhan entries are expected before the exposition opens. Captured German Fokker planes, now in the possession of the Dominion Government, will be admitted to the contests, it has been decided, provided their these erail there now.
- (14) The London Daily Express offers a prize of £10,000, open to the whole world with the exception of the late enemy countries, for an air flight establishing communication on a commercial basis with India and South Africa. All competing machines must carry a deful cargo of at least one ton on both outward and homeward flights.

Factors to be considered in the award will be the average reliability and airworthiness of the machines.

- (15) Gabriele d'Annunzio, poet and aviator, has arranged to attempt a flight from Rome to Tokio and return. The trip will last altogether a month, and the aviator purposes to cover about 20,000 miles.
- The route will lay through Asia Minor, India, Tonkin and China to Japan. D'Annunzio has arranged for stations along the route where he can replenish his supplies.

These contests, held under the rules and regulations of the International Aeronautic Federation, are open to all pilots holding a Federation pilot certificate, which is issued in the United States by the Aero Club of America, 297 Madison Avenue, New York City.

HAVE ANY MERITORIOUS CASES BEEN OVERLOOKED?

THE Acrial League of America has awarded Diplomas of Merit to Commander A. C. Read, the hero of the trans-Atlantic flight; Flight Lieutenan Stone and the other members of the crew of the NC-4, and Commander John II. Towers, Commander J. N. L. Bellinger, Commander II. C. Richardson, and the other members of the Crews of the NC-1 and NC-3, and Commander R. E. Byrd, who invented the Byrd sextant.

Major-General Mason M. Patrick, who was chief of the U. S. Air Service overseas during the war, now the U. S. Army representative on the Aeronautical Commission of the Peace Conference: Rear-Admiral D. S. Knapp, U. S. Navy representative on the Aeronautical Commission of the Peace Conference: Brig-Gen, Theodore C. Lyster and Lt.-Col. I. H. lones, who were foremost in organizing the Air Medical Service; Col. Halsey Dunwoods, executive officer of the U. S. Air Service overseas; Col. E. Lester Jones, Col. Charles Elliott Warren, Col. B. J. Arnold, Col. Thurman W. Banc, Col. C. G. Edgar, for exceptional services rendered to the United States during the war; Col. C. C. Culver, who developed the radio telephone; Lt.-Col. A. R. Chrustie, Lt.-Col. W. G. Kilmer, for exceptional efficiency while in charge of the U. S. Army Aviation centers in France; Col. Charles De F. Chandler and Col. Frank P. Lahm, for exceptional efficiency while in charge of the U. S. Army Balloon Service in France; Mai, I. C. McCoy, Mai, Thomas S. Baldwin and A. Lee

Stevens, for exceptional efficiency in organizing the U. S. Army Balloon Service; Capt. Charles J. Gildden, for exceptional services rendered in recruiting for the U. S. Army Air Service; Maj. John M. Satterfield, for exceptional efficiency in connection with the administration of the Air Service in France during the war.

Every one of these men well deserved the honor conferred on them by the League. It would take pages to relate the extent of their achievements,

The League is considering the award of the Diploma of Honor to other officers in the Army, Navy and Marine Corps Air Service and to others who have rendered valuable services to the cause of civilization and humanity. The secretary of the League states that it is the League's desire not to overlook deserving men who should receive the diploma, which has also been awarded to all the aces, and to the parents of all those who lost their lives or were injured while in the service during the war. Readers of Austa. Aux are requested to advise the League of any deserving case that may have been overlooked. Address the secretary, Aerial League of America, 280 Madison Avenue, New York City.

By these awards the League is rendering another service of national importance. The least the country can do to those who served faithfully and made sacrifices to help to bring the war to a successful end is to show its appreciation.



THE NEWS OF THE WEEK



New Army Airship in 407-Mile Test New Army Airahip in 407-Mile Test Starting from Akron, Ohio, at 10 o'clock July 11, the new army dirigible A-4, fly-ing against strong head winds, reached Bolling Field, Washington, at 9:45 a.m., July 12. After a stop of an hour and a half the airship rose again and started for Langley Field, Hampton, Va., where she arrived late July 12.

Reports to aviation headquarters said the dirigible covered the total distance of 407 miles in eighteen hours, flying time, at an average speed of a little more than twenty-one miles an hour. Heavy fog was encountered throughout the first lap of the journey, necessitating flying at a height of 4,000 feet. Lieutenant G. W. McEntire was in command, and had two assistants aboard.

The A-4 is 162 feet long and 33 feet in diameter. Its cubic contents are 95,000 feet. It has a total lifting capacity of 6,460 pounds.

Throngs See NC-4 in Park Crowds of people have visited the NC-4. first transatlantic air-cruiser, which is on view in the Sheep Meadow, Central Park. The flying boat is in a roped inclosure and a guard is established to prevent the

and a guard is established to proceed and a guard is established to proceed to the plane in New The exhibition of the plane in New I and August 1. Then the machine will be taken apart for shipment to Washington, where it will be re-assembled and mounted at the Smithsonian Institution

Raymond Ware Marries While Miss Catherine Munroe Schurman, eldest daughter of President Schurman, rotest daugnter of Frestoent Schir-man of Cornell University, was being married in Sage Chapel on July 12 to Raymond Ware, of the Thomas-Morse Aircraft Corporation, a squadron of acro-planes soared back and forth over the church. Dr. Henry Van Dyke of Prince-ton officiated at the wedding.

Charters Seaplane to Catch Steamer at Sea Chartering a seaplane at \$1 a minute for

a fight to catch the steamer Kaisha Maru, which he missed when the vessel sailed from Seattle for Oriental ports, J. J. Mayer, Seattle Red Cross worker, booked for Vladivostok, succeeded in catching up with the ship near Port Townsend, Wash., after a thirty-five minute flight,

Aviators 20,000 Feet in Air Saw Two Sunsets in a Day Seeing two sunsets in one day was the

dia, Fla., in an altitude flight on July 10.

Leaving Carlstrom Field after dark, in an experimental flight for altitude, Lieu-tenant Charles C. Chauncey and Sergeant Thomas Cook soared in a Le Pere aeroplane to a height of 20,000 feet. weather at the height was clear, the thermometer in the rear cockpit registered five degrees below the freezing point, and the sun was sinking below the western horizon.

First U. S. Airplane Flies Into Canada Armed with the first permit ever gramed by the Canadian military authorities for an aeroplane flight across the international boundary, two American aviators arrived July 12 on a "courtesy visit" to the Aerial League of the British Empire, Montreal Branch.

The visitors, Lieut. O. S. Parmer and Ensign G. D. Garmon, flew from the Junior Camp at Platisburg, N. Y., covering forty-five miles through a heavy rainstorm in fifty minutes.

Buffalo to New York in Five Hours

Roland Rohlfs, experimental pilot for the Curtiss Aeroplane and Motor Cor-poration, flew from Buffalo to New York on July 10 in a Curtiss Oriole threepassenger aeroplane in five hours and two minutes, thus making the trip in almost half the time of the Empire State Express.

From Buffalo to Albany Mr. Rolds averaged 100 miles an hour. Below Albany, where cross winds were encoun-tered, the speed was reduced to sixty

miles an hour. The flight was made for the purpose of carrying to New York in time for the dinner given by Glenn H. Curtiss to the commanders of the transatlantic seaplanes commanders of the transatianite scapianes at the Commodore Hotel, Thursday night, 200 copies of a history of the flight which were printed too late to catch the train from Buffalo. The books reached Garden City at half-past six o'clock in the evening and were delivered soon after the

diners sat down. Mr. Rohlfs will attempt in the next few days to beat the world's altitude record of 33.136 feet.

Aerial Board in Paris Announces Air Rules

Principles to govern aerial navigation, already accepted by most of the Allied Nations, have been announced by the Aeronautical Commission of the Peace Conference, which recently ended its

work. These principles are contained in international convention which provides for the creation of an international commission. The principles laid down concern the nationality of airships, certificates of navigability, rules for flying, lists of forbidden routes, steps to be taken by all signatory nations to develop aerial navigation, various provisions governing the licensing of aviators, equipment of aeroplanes with signals, distribution of weather reports and customs regulations.

Madam Petrova in Aerial Contest

Having become so greatly enthused over peronauties since her first visit to the Atlantic City Airport a month ago, Madam Olga Petrova, the noted Russian star of the screen and the speaking stage, paid a second visit to the Atlantic City Airport on July 10.

on July 10.

Accompanying Madam Petrova was:
Mr. Jules Aaronson, managing director of
the Keith theater interests in Atlantic
City, where Madam Petrova in playing a return engagement.

Madam Petrova has become so enthusi astic over aviation from a sporting and commercial standpoint that she chal-lenged Mr. Aaronson to a race of twentyfive miles for a wager of \$1,000, and great interest centered in the contest which was witnessed by a large assemblage of spec-tators, including over a thousand promi-nent Elks from all parts of the country who are in Atlantic City attending the Grand Annual Elks' Convention.

The race started at eleven o'clock from the Atlantic City Airport and was over a course of twenty-five miles along the beachfront, where it was witnessed by thousands of cheering promenaders on the



Madama Olga Petrova, noted Russian star of the screen and speaking sings; Mr. Jules Aaronan, Manigaing Director of Kellt's Thome's interests in Atlantic City, Lepton Memousa, Media prominent Elsa stateding Annual Elka "Convention in Atlantic City, in Front of Aerial League of America Clubhouse on Atlantic City Airport, just after Madama Petrova's aerial race of 25 miles with Mr. Aaronane, for a wager of 31,000.

Boardwalk, where the interest in the outcome ran high. Mr. Aaronson covered the distance in 18 minutes and 30 seconds, with Madam Petrova. a close second, fin-ishing in 18 minutes and 42 seconds.

The interest shown by prominent Elks who witnessed the race and who attended the special aerial program, held on Elks' Day, July 9, augers well for the rapid advancement of aeronautics, as the lodgeadvancement of aeronautics, as the lodge-men are from all parts of the United States and include in their number Gov-ernors of States and high Government officials, many of whom complimented the officials of the Airport on its up-to-date facilities for the receiving and housing of aircraft and predicted that the very near future would see the acroplane in the role of an absolute necessity in the commercial world.

Aerial League to Collect Meteorological

Having been advised by the officers of the British dirigible and Army and Navy officers the frequency of transatlantic aerial cruises depends on the building of suitable hangars and making available meteorplogic data regarding prevailing smtatore languages and making available meteorologic data regarding prevailing winds and other aerologic data, the Aerial League of America has taken steps to collect this data and establish a center where air navigators can gather all the information available on the subject,

information available on the subject.

The Committee of the Aerial League who visited the Atlantic City Airport decided that the Airport is the most favorable place to establish such a station, and arrangements are being made to use one of the buildings at the Airport for this purpose.

this purpose.

The Aerial League of America will cooperate with the U. S. Weather Bureau,
the Coast and Geodetic Survey, the Army,
the Navy, the Post Office, the Aero Club
of America, and other Government and scientific and aeronautic organizations interested in the development of science of aeronautics.

The Aerial League has already gathered at the Airport an extensive collection of transatlantic flights' data, including pho-tographs and reports and charts of all

the transatlantic flights made or planned. the transatiantic fights made or planned. This includes about fity photos showing the NC seaplanes and the Vickers-Vimy taken in different stages of construction and at different periods during the trans-

atlantic flights.

The committee which will supervise the work of collecting this data includes the following prominent aeronautic authori-ties: Rear Admiral Robert E. Peary, Peary, Major Thomas S. Baldwin, Henry Wood-Major Thomas S. Baldwin, Henry Woodhouse, vice president, Aerial League of America; Colonel E. Lester Jones, Director Coast and Geodetic Survey; Colonel Charles Elliott Warren, Captain Robert A. Barlett, John Hays Hammond, Jr., Albert T. Bell, Brigadier General Theodore C. Lyster, Colonel Isaac H. Jones, Lieutenan Lawrence B. Sperry, League and Charles and Lawrence B. Sperry, Carte Colones, Captain Captain Colones, Captain Captain Colones, Captain C Rear Admiral Colby M. Chester, and G. Douglas Wardrop.

Cleveland Aviation Club Entertains N.C Crew

The Cleveland Aviation Club entertained the crew of the N-C-4 at the Yacht Club, Cleveland, on July 14. Ensign Rodd, who is a native of Cleveland, was presented with a loving cup. The meeting was a most enthusiastic one,

Aero Club of Iowa Formed

Capt. James Normal Hall, of Colfax, Iowa, has been named honorary presi-dent of Aero Club of Iowa, recently ordent of Aero Club of Iowa, recently or-ganized at Des Moines, at a luncheon attended by a score or more of Iowa aviators. A campaign has been started to secure the names of the many flyers in the state who have received their pilots training both in this country and

on the other side.

Officers of the new organization were chosen as follows: Clarence M. Young, president; Dale Griswold, vice-president; Harvey Ray, secretary, and Howard C. treasurer. An advisory board of Eales, treasurer. An advisory board of prominent and influential men from vari-ous parts of the state will be named. Several state officers, including Governor W. L. Harding, have expressed their de-

sire to become affiliated with the organization.

The Iowa club promises to be a live organization and already a number of movements for the promotion of com-mercial aviation have been launched. One of the first steps to be taken up will be the establishment of municipal landing fields. Several commercial aviation en-terprises have been started in the state, and a number of other projects are under

Elks Visit Atlantic City Airport

Close to ten thousand Elks from all parts of the United States and members of their families visited the Atlantic City Airport, the first airport in the world, on July 9 and witnessed an elaborate program of aerial acrobatics arranged for their special benefit by the officials of the

Atlantic City Airport, The main event of the day was a spectacular demonstration of aerial mail dropping by means of parachutes from a speeding aeroplane.

To demonstrate with what ease and accuracy mail can be dropped over aerial mail stations or landing fields, Lieutenant mail stations or landing fields, Lieutenant R. L. Dunn, late of the U. S. Army, piloted his Curtiss type aeroplane to a height; of over 2,000 feet above the Airport, with two parachutes, each having attached a twenty-five pound weight, representing the average bag of mail, and Mr. R. E. Shinn, one of the assistant secretaries of the Airport released the parameter which be placed. chutes, which landed perfectly within a hundred feet of the spot selected. The remarkable value of this demonstration lies in the fact that this was Mr. Shinn's first flight in an aeroplane, and he had nrst night in an aeropiane, and he had absolutely no previous experience in han-dling parachutes of any kind. This proves the efficiency of this means of delivering mail and demonstrates clearly the ac-curacy with which present day types of parachutes can be handled by even those inexperienced in their use.

The huge delegation of Elks was very enthusiastic over the entire program, and over 250 made flights over the city after the program was completed.

Flyers in Four Machines to Surv Million Acres of Labrador Timber

A commercial aerial expedition that will revolutionize the work of forestry will revolutionize the work of forestry survey and land photography, according to its managers, was announced by Cap-tain Daniel Owen, until recently of the Royal Air Force. He said a fleet of four aeroplanes would leave Battle Harbor. Labrador, under his command, and would survey one million acres of forest and timber land along the coast of Labrador. The work is being done for a syndicate of Boston bankers.

of Boston bankers.

A steamship left Annapolis, Nova
Scotia, carrying forty men, who will comprise the aeroplane expedition. Capitain
Owen also went to Battle Harbor. The
four aeroplanes are awaiting the force

there.
"This has never been attempted before," Captain Owen said. "We will do as much work in this way in six days as we could do in the regular way in four or five years. All of the pilots excepting myself will be Americans recently discharged from the United States Army. The planes will be Canadian training machines."

The planes will be Canadian training machines."
A staff of physicians, headed by Dr. Irwin Tiss, of Ashland, Mass., will accompany the crew, with a full commis-



A view from above, showing the comfortable seating arrangement for 4 passengers in the "Airco 16" seroplane

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The AIRCRAFT TRADE REVIEW



Curtiss Secures Large Order

The largest peace-time order for aeroplanes was placed recently by the Curtiss Aeroplane and Motor Corporation with

its Buffalo plant.

The order calls for the building of 225 planes-both land and water-and 200 mo-One hundred and fifty of the planes will be the new Curtiss Orioles, the new three-passenger land machine which has three-passenger land macrine when nas already attracted world-wide attention, and seventy-five Curtiss Sea Gulls, the MF boat equipped with a higher-powered motor and changed in hull construction to motor and changed in hull construction to admit of two passengers and a pilot. The motors are the new Curtiss 150 horse power motor. These motors, which will be the motor equipment for the Orioles and Sea Gulls, have a fuel consumption performance which has been demonstrated at one-tenth of a cent per mile.

Work upon the order will be begun at

work upon the order win be begun at once at the Churchill plant of the Curtiss Aeroplane and Motor Corporation, which has been placed upon a production basis, and it is expected that a working sched-ule of one plane a day will be in operation

in the near future.

The Oriole, announced by the Curtiss company during the month of May, proved a sensation. Before the second proved a sensation. Before the second machine was completed, the sales depart-ment in New York had received orders for more than 100 from customers all over the United States.

The Curtiss Corporation now has dis-The Curtiss Corporation now has dis-tributors organized in all sections of the United States, and on August 9 C. W. Webster, supervisor of South American sales, will leave with a mission to tour the South American countries for the purpose of demonstrating American-made planes and, at the same time, to stimulate and promote aviation in general. He will and promote aviation in general. He will take with him several of the best known pilots in the country and also the latest models, including the Oriole, Sea Gull, Hornet, the fastest two-place fighting plane, together with the OX-5 motors and the new Curtiss 150 and 400 horse power

Bossert Cleveland Office

The Bossert Corporation of Utica, N. Y., sheet metal stamping specialists, has opened an office in Cleveland at 611 Citizens Building. W. W. Visy, Western sales manager, is in charge. Bossert Corporation of Utica.

Huge Dirigible Proposed

At a conference of engineers and shipbuilders at Newcastle, England, Sir Charles Parsons predicted that an airship would be built soon of 8,000,000 cubic feet capacity, four times the size of the R-34, and capable of making a 15,000-mile non-stop journey. He added that a large flying boat was to undertake such a voy age from England to the Cape of Good Hope, crossing Africa from north to south and utilizing rivers and lakes as landing places if need be.



Bruce Eytinge and Chin Y. Chong, a Chinese whom he taught flying at Central Park, L. L.

American Importers Order British Linen

American importers of Irish linen have received information from London that the 30,000,000 yards of aeroplane linen, which was recently sold to an English trader for £4,000,000 was made up of widths running from 25 to 72 inches. The goods which comprised the complete surplus stock held by the British government, were disposed of on the basis of 2 shil-lings, 8 pence a yard. Belfast mill owners offered to buy the stock at 3½ pence a yard. The quantity sold is about threeyard. The quantity sold is about three-fifths of the yearly output of the Belfast looms under normal conditions.

Long Island School Acquires New Field

Business at the Long Island Aviation Co. field at Central Park, L. I., has in-creased to such an extent that another field has been opened at Massapequa nearby, so that the passenger carrying work would not interfere with the regular

course of instruction.

The location at Central Park is ideal for a flying school site, inasmuch as it is within an hour's ride of New York City, surrounded by miles of the most excelent terrain in the East. The field itself is one and a half miles long by a half mile wide, and perfectly level

The aeroplanes used at the Long Island Aviation School are the Canadian training planes, JN-4 Type, equipped with dual controls, so that the novice is safe in the assurance that the skilled pilot can take control of the plane at all times. The Miessner aerophone facilitates the work of instruction. Students are given additional training in the working and construction of aeroplanes,

INTERNATIONAL AIRCRAFT STANDARDS COMMISSION ORIGIN

URING the war, owing to the necessity for rapid production of aircraft and the common shortage of material, it was considered advisable to nominate an Inter-Allied Commission to study the question of the standardization of aircraft materials and components interaircraft materials and components inter-nationally. This Commission was author-ized by the Allied governments and is composed of national committees ap-pointed in the chief Allied aircraft manu-facturing countries, namely, Great Britain, France, United States, Italy and Canada, Its organization is regulated by a set of statutes which have been agreed to by those co-operating in the work. The first meeting was held in London in March, meeting was need in London in March, 1918, and was opened and addressed by Mr. Winston Churchill, then Minister of Munitions; Lord Weir (then Sir William Weir, Director General of Aircraft Production, later Air Minister) and others being present.

Aims and Objects

A second meeting of the International Commission, on this occasion presided over by Sir Arthur Duckham, K. C. B., Director General of Aircraft Production, was held in October, 1918, when it was decided that when the war ceased the work of the Commission should not be allowed to terminate, but should be continued on a peace basis, with the following aims and objects:

(a) To study and recommend the in-

dustrial and technical standards best suited to the effective and rapid construc-

tion of aircraft, with the maximum standardization of material, specifications and interchangeability of component parts

and the minimum of maintenance cost.

(b) To keep abreast of all inventions and progress by constant and periodic revision of the standards recommended.

(c) To secure approval and government acceptance of the "International Air-craft Standards" issued by the Commiscraft Standards is sued in the Standards in the Standards in the Standards is sued in the Standards in

National Committee

The Commission at present consists of ix national committees representing the following countries:

Italy Canada France Japan United States Great Britain At the October meeting mentioned above the statutes were revised so as to

above the statutes were revised so as to permit the eventual co-operation of other countries in the work of the Commission with the advent of peace.

Any country, therefore, which does not

already participate in the work of the Commission and desires to do so has the right to make application for membership to the Central Office for consideration at to the central order for consideration at the next plenary meeting, but can only take part in the work subject to the ap-proval (four-fifths of the votes received) of the Commission in plenary meeting. The report of the October meeting, 1918, (A. C. N. 6D) gives in detail the various subjects which were considered

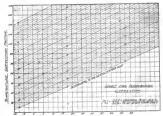
at that time as being susceptible to early international agreement. Eleven inter-(Continued on page 906)

4 and 5 for obtaining the temperatures after compression, to according to Equation 2, and the temperature correction factor

(F1)1 respectively.

In using the chart for compression temperatures it is unnecessary to determine the temperature of the altitude, as this is a function of the altitude barometric pressure, and is incorporated into the chart. To use this chart, locate carburetor pressure on the horizontal scale at the bottom, trace vertically upward to the line of barometric pressure corresponding to the given altitude, then horizontally to the curve of the desired compression exponent. From there trace vertically upward or downward to the line corresponding to the barometric pressure of the altitude, and horizontally to the right to the scale of temperatures. This gives the temperature after compression in degrees C.

The temperature correction factor (F2), may be obtained from the chart in Fig. 5. To use this chart, locate the observed temperature on the ground, to on the horizontal scale at the bottom, and trace vertically upward to the line corresponding to the compression temperature as obtained from chart in



P TENTERATURE OF CHERNELISM AND DV RESIDEN (SEATERS GEST) Figure 5-Chart for temperature correction

Fig. 4. From there trace horizontally to the line of correction

factors.

An example may serve to illustrate the use of the curves and charts. Assume that an engine capable of developing 400 persenumer on the ground at a temperature of 10° C. (50° F.)

and charts. Assume that an engine capable of developing 400 horsepower on the ground at a temperature of 10°C. (50°F.) is to be equipped with an exhaust pressure turbine blower, which at a harmonetric pressure of 35 cm. Hg (corresponding to 21,1100 feet a directly of a temperature of -21°C.) (see the control of the cont exerts a back pressure on the engine of 35 cm. Hg and increases the carburetor pressure by 30 cm. Hg. Then we have for the exhaust pressure on the engine at a given altitude 35 + 35 = 70 cm. Hg and for the carburetor pressure we have 35 + 30 = 65 cm. Hg. From the curves in Fig. 3 we obtain a horsepower ratio of 0.836. To obtain the temperature after compression we may assume an adiabatic compression with an exponent of 1.41, and from the chart in Fig. 4 obtain a temperature after compression of 30° C. From the chart in Fig. 5 we obtain the temperature correction factor to correct from 10° C. to 30° C. = 0.963 Substituting these values in Equation 1 we obtain for the horsepower at 21,100 feet, with exhaust pressure turbine blower supercharging equipment: $400 \times 0.836 \times 0.963 = 322 HP.$

If a geared blower were used, then in obtaining the horse-power ratio the barometric, pressure at the given altitude

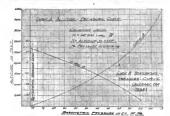


Figure 6-Altitude and temperature pressure curves

would be used as the back pressure on the engine; and from the available output computed on this basis the power necessary to drive the blower would be deducted.

If it is desired to include, as a further refinement in the above computations, a correction to the observed horsepower on the ground, HP, for barometric pressure, the output as computed by Equation 1 may be multiplied by a pressure correction factor obtained from Curve "E" in Fig. 3, as follows:

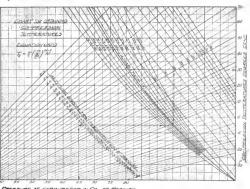
Locate the intersection of Curve "E" with the curve of carburetor pressure corresponding to the observed barometric pressure on the ground, trace horizontally to the left and read horsepower ratio. The barometric pressure correction factor is 1 divided by this horsepower ratio.

An illustration will serve to make clear the use of this correction factor. Assume that in the above example the observed horsepower (400) was obtained at an observed barometric pressure of 74 cm. Hg. From Curve "E" we obtain, by the method described above, a pressure correction factor of

- (see Fig. 3) = 1.03. Applying this to the horsepower ob-972

tained, we get

 $322 \times 1.03 = 332^{\circ} HP$.



PRESSURE AT CARBURETOR IN CH. OF MERCURY

Figure 4-Chart for obtaining compression temperatures

A PORTABLE HANGAR FOR AEROPLANES

SINCE aviation became a scientific dem-onstration instead of a theory, it has been the endeavor of aviators and engineers to construct a portable aeroplane hangar that would combine ample working space without waste of material. strength of wind resistance sufficient to withstand storms even when they approach cyclonic velocity, and ease of egress and ingress.

During the war the Aviation Section of the War Department made numerous experiments along this line with indifferent success. Severe tests of a newly designed portable hangar of this kind were made last week at the U. S. Flying Station at Hazlehurst Field, Mineola, L. I., under the supervision of Major J. E. Rossell, Engineering Officer of the Army Air Force stationed there. The hangar, manufactured by Foster & Stewart Co., was erected in a gale of wind and stood up against a heavy rain storm that came up during the night.

These wind-proof hangars are easily transported from field to field, and can quickly be erected by the crew of the machine it is built to protect. They are standardized for the various makes of planes, and are particularly suitable for the JN-4 type Curtiss.

which allows 31/2 feet on each side to the tips of the plane. The walls of the main body of the tent are 12 feet, allowing ample clearance space for the ingress and egress of the plane, yet making the highest point of wind resistance only 13 feet. At this point the hangar is protected by a double set of guys which are built into the tent, and which criss-cross themselves in a manner to balance the strain no matter from what direction the wind may blow. There is nothing to unfasten or to become unfastened, as these guys, passing as part of the top completely over the hangar, are fast to the rings the poles go in. The extension to accommodate the fuselage is of ample size to allow working room, and is designed at an odd slaut to shed wind and water. It is guyed just as substantially as is the main body of the hangar.

The detail of the construction is simple Likewise the method of erection. All that is necessary is to spread out the tent, and put it up. The JN-4 hangar can be erected by two men in a short time.

When the tent is up, the front wall is tight, but is attached to a cable at the top, and can be opened from the center, portiere style, for the ingress and egress of the plane. When close, these center pieces tents and purposes a continuous piece of canvass. Iron pegs at the bottom secure the front to the ground.

The width of the hangar is such that there is ample room for cots or camp beds under the tips of the upper planes, and the walls are so made that they can be rolled up six feet and then firmly lashed, giving air from all directions.

This hangar first was erected the Sunday previous to the Government inspection on the flying field of the Hotel Nassau, at Long Beach, L. I., where former Lieuts. Lyman B. Lockwood and Edward K. Merritt have established a passenger carrying business.

The specifications of the IN-4 Curtiss hangar, are as follows:

The total width of hangar is 51 ft., and depth 39 ft. The dimensions of plane space are: 51 ft. width by 17 ft. 2 in. in. depth, and the height to the center, 20 ft. Walls and front are 12 ft. in height.

The dimensions of the extension to accommodate the fuselage are 16 ft. 6 in. deep, the wall at the right being 12 ft. in height, and on the left 7 ft, in height, The wall of the tent on front, sides and ends is constructed to roll to height of 6 ft, and to lash to allow a free circulation of air.

The top is made of 12-oz. khaki, all hand roped with 9/16-in, and 5/-in, diameter manila rope. All walls and ends are of 8-oz, double filled khaki with wind bands for strength throughout; all handroped at ends and bottom. The bottom of the ends and walls are equipped to snap to iron pins 12 inches long with an eye, and the front wall to snap to cable 3/16 in, diameter with two turnbuckles. The front wall is to slide from center to ends. and the front is lashed to 15-inch diameter cable with two turnbuckles and ropes to pass through thimbles to prevent chafe.

All guys of manila rope 9/16 in, in diameter are fastened to tent, and are non-detachable. All lanyards are of 1/4in. manila rope, and all 12 and 7-ft, pole lanyards are of 5/16 in. manila rope. All lacing holes are No. 4 sheet brass grom-mets, and all holes to receive poles on lower edge of tent are round galvanized thimbles, preventing chafe to any rope. All other pole holes in upper part of roof are of drop forge rings, hand-worked

roof are of drop forge rings, hand-worked in and leathered to protect ropes leading through the bottom of tent to rings. Poles: two, each 20 ft. long by 45′; in: in diameter; two, each 15 ft. long by 33′ in: in diameter; two cable poles, 12 ft. by 5 in, in diameter with sheaves which cross pole 16 ft. 9 in, by 35′ in.

Total stakes: thirty-eight, hickory wood, each 40 in. long, banded and painted.

Iron pins for bottom of wall and ends:

forty. Weight: Tent and wall, 530 lbs; stakes, 191 lbs.; cables, 122 lbs.; poles, 882 lbs.; total weight, 1,725 lbs.



A compact canvas hangar for a Curtise JN aeroplane, erected at Hazeihurst Field, Mineola, for the purpose of testing it under severe weather conditions

THE GENERAL PROPERTIES AND USES OF PLYWOOD

By B. C. BOULTON, B.S., A.E.

PART III

(Continued from page 815)

THE ordinary thickness for the veneer in either the threeor five-ply construction is 1/32 in, for each ply. In general fuselage work the thickness of the core is usually about 50 per cent that of the plywood.

Though light can part to the same way, the bulk-heads in the rear portion of the lody are restricted. In the same way, the bulk-heads in the rear portion of the lody are relaced in number to about three, and serve solely to stiffen the structure. It is possible to bulk such a loss long the same way, the bulk-heads in the rear portion of the lody are relaced in number to about three, and serve solely to stiffen the structure. It is possible to bulk such a fuseling for a weight considerably less than that of any other type. Unfortunately, owing to the as yet is expensive. Methods may be evolved that will simplify the present process.

plify the present process.

The general method of construction is as follows: First, a heavy wood form is built up which is the exact shape of the heavy wood form is built up which is the exact shape of the form is ready, the work of putting on the teneer is begun. There are two general methods for building up the body. The customary process is illustrated by the well known LWF, fuselage and is quite reasonable in cost. With this type, thin forms so as to make about on turn in the length of the body. After this, first layer of veneer is complete, cloth tape some 23/4 in. wide is wound over the veneer in a continuous strip, lapped about 3/6 in, and glue applied. Amother layer of veneer degree, but opposite in direction to the first. On top of this comes a second layer of tape wound as before. The third and last layer of veneer is now applied with the grain longitudinal, which with this method of construction is not in two halves but is collapsible, is removed. One layer of Utica sheeting, applied to the outside of the body with dope, forms the finish. Spruce veneer has been found very satisfactory. A small confidence is the strain of such a fuselage are symmetrical about two axes. It is not practicable with this type to form the veneer inn sharp curves, and therefore the fairing of the lower wing into the body, or the construction of the fin integral with the body, is very

The second general method carries out still further some of

the principles involved in the construction just described. It is probable that better results in every way can be obtained in a hody built according to this later process. However, on adapted to large scale protein conside, it is a method not adapted to large scale product conside, it is a method not adapted to large scale product of the process, the venere in long, narrow strips not more than 21 in. wide is wound on each half form in a tight spiral of such degree that the strip makes an arrise strip sarrow strips are crowed close together and are lightly tacked down to hold them in place. On completion of this layer, the second is begun. The strips now run at right angles to those forming butted up close against each other and securely firmly in place by short, light mails every 4 or 5 im, driven through a little 1 in clean to playwood. After the glue has thoroughly driced by the product of the scale large through the product of the scale large through the product of the product of the scale large through the scale large through the product of the scale large through the product of the shell are now ready to be fitted together. The scale large through the product of the shell are now ready to be fitted together. The scale large through the product of the shell are now ready to be fitted together. The scale large through the product of the shell are now ready to the fitted together. The scale large through the product of the shell are now ready to be fitted together. The scale large through the

being about 1/16 in. in thickness, Balbhedat's in the forward part of the fatelage the bulk-Balbhedat's in the forward part of bits tankend feverive stresses from the lift wires are of heavy construction. To secure maximum homogeneity a large number of piles, each of 1/16 or 3/32 in. thickness, is used. The total thickness of the such bulkheads will ordinarily be between ½ and 1 in. If but on 1/16 and 1/1

Another more recent type of bulkhead which is much lighter



Fig. 9. Veneer Fuselage Complete, showing longitudinal and transverse Splices in Skin. Fuselage ready for Saud Test

than that just described is a form of built-up, truss construction, in which the stresse are carried by soid aprue emmbers. These are connected, and built into one structure by two light sheets of three-ply venere, which form flanges for the sprace sheets of three-ply venere, which form flanges for the sprace Reference to Fig. 10 will make the construction clear. The gains with this type of builthead are due to the smaller amount of give necessary, and to the fact that, because all the grain of the material is most effectively used. derection of the stress,

TABLE 4

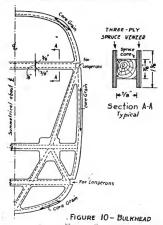
COMPARISON OF STRENGTH OF THREE, FIVE, AND SEVEN-PLY
YELLOW BIRCH PLYWOOD. ALL PLIES OF SAME THICKNESS IN ANY ONE PANEL

No. of Plies	Av. Sp. Grav.†	Av.	No. of Tests	Colu Bene Mod In Ibe	ling utus . per	Tens In the	per	Av. Splitting Resistance Compared to 3-ply Hirch, for the same Plywood		
			-	Parallel	Per- pend*	Parattel	Per- pend*	Thickness. In % of 3-ply		
3 5 7	. 65 . 67 . 70	6. t 6. 6 7. 1	80 25 25	19,100 14,700 14,300	3,700 6,800 7,900	14,400 13,100 12,900	7,900 8,600 9,300	100 143 212		

†Specific gravity based on oven dry weight and volume at test.

*Parallel and perpendicular refer to direction of grain of faces relative to direction of application of force.

In veneer fuselage construction, the bulkheads in the rear act principally as stiffening rings in preventing distortion of the skin. As they carry only these secondary stresses it is possible to make them light. Five-ply spruce of ½ in. total thickness, for leve-ply malogany and poplar of the same thickness, for instance, is suitable for most work. Fig. 8 illustrates some of the various features that have been discussed.



Covering for Il'inga and Control Surfaces: Plywood, when use to replace fabric on aerofolis, has several adaptatiges. One of these is the elimination of sag between ribs, this discount is the same of the same o

too thin, adds materially to the structural strength of the wing, making it possible to omis internal drift bracing, and to reduce the size of the spars. On the other hand, the plywood may warp or writisk, though proper design and care in the method of application should prevent this trouble. Even the lightest times as much as doped fabric. Probably the best, very thin plywood so far designed is constructed of Spanish cedar, and lasa a total thickness of 1/25 in. This makes it to to thin to add directly to the structural strength of the wing. Its principal use would be on control surfaces, on the center section of the leading edge back to the front spar.

Unless some great improvement occurs in the design of plywood for wing covering and in its application, it cannot be used on modern planes on account of its excessive weight.

used on modern panies on account on its excessive weight, and the panies of the panies

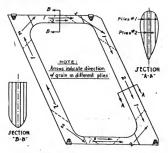


FIGURE 11 - Portal interplane strut

Struts: In order to minimize the effect of spiral or crossgrain in spruce, a laminated construction is sometimes used in struts. Since the grain of all the laminations runs in the

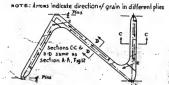


FIGURE 12 - Cabane or center section Strut

TABLE 5 WEIGHTS OF VENEER In Ounces per Sausse Foot of One Ply. Veneer Thickness in Inches

Species	Sp. Grav. Oven-Drv based on Volume Air-Dry	Air-Dry Monture content percent	t/100	1/80	1/64	1/60	1/53	t/48	1/40	1/32	t/28	1/24	1/20	1/16	1/12	1/10	1/8	1/6	3/16	1/4
Ash, Birst. Ash, White. Berkel, Ash, Where. Berkel, Ash, Wash Berkel, Yellow Berkel, Yellow Berkel, Yellow Berkel, Wash B	. 61 43 . 51 . 52 . 52 . 69 . 63 . 69 . 63 . 69 . 50 . 50 . 50 . 43 . 42 . 66 . 63 . 64 . 63 . 69 . 63 . 69 . 63 . 69 . 63 . 64 . 64 . 65 . 65 . 65 . 65 . 65 . 65 . 65 . 65	10 4 8 7 4 11 2 5 6 9 2 7 8 8 8 10 5 6 11 3 19 2 2 8 10 5 10 9 1 11 5 16 1 17 8 18 9 18 9 18 9 18 9 18 9 18 9 18 9 18	42 53 52 52 32 42 43 43 41 45 40 52 52 52 57 34 42 47 37 38 37 38 38 38 38 38 38 38 48	52 67 40 66 66 64 41 53 45 53 53 54 54 55 65 65 66 66 67 27 23 43 45 44 69 99 99 99 99 99 99 99 99 99 99 99 99	655 828 499 822 822 826 866 868 868 870 822 990 853 853 854 855 864 870 855 864 871 855 864 871 872 873 874 875 875 875 875 875 875 875 875 875 875	89 89 85 85 87 867 86 87 96 60 611 58 82 517 54 45 85 64 447 68	766 977 588 935 955 977 765 777 79 74 82 23 1.05 65 67 66 65 67 66 65 67 76 86 65 67 77 78 86 86 86 86 86 86 86 86 86 86 86 86 86	.87 1.11 .66 1.09 1.09 88 88 .90 85 .94 .83 1.09 1.20 .71 .76 .76 .76 .76 .76 .76 .76 .76 .76 .76	1.04 1.33 79 1.31 1.31 1.06 1.08 1.08 1.02 1.129 1.129 1.144 1.190 9.22 8.11 1.144 1.199 9.22 8.11 1.144 1.199 9.22 8.11 1.144	1. 30 1. 57 99 1. 64 1. 64 1. 62 1. 33 1. 125 1. 28 1. 40 1. 30 1. 12 1. 15 1. 10 1. 17 1. 18 1. 19 1. 10 1.	1.49 1.90 1.13 1.87 1.87 1.87 1.87 1.85 1.46 1.52 1.55 1.46 1.51 1.43 1.85 1.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	1.74 2.22 2.19 2.19 1.37 1.49 1.57 1.60 1.57 1.67 1.67 1.67 1.67 1.67 1.67 1.67 1.6	2.08 2.62 2.62 2.62 2.62 2.12 2.17 2.17 2.17 2.17 2.17 2.17 2.1	3.33 1.98 3.28 3.28 3.28 2.05 2.24 2.65 2.71 2.71 2.55 3.29 2.29 2.18 2.29 2.29 2.18 2.19 2.19 2.19 2.19 2.19 2.19 2.19 2.19	3. 47 4. 44 2. 64 4. 37 4. 37 3. 64 3. 64 3. 63 3. 61 3. 40 3. 75 4. 37 4. 37 5. 37	5 32 3 16 5 24 5 24 3 25 4 25 4 33 4 83 4 40 5 16 5 24 5 24 5 24 5 24 5 3 56 3 56 3 56 3 56 3 56 3 56 3 56 3	6 66 3.96 6.56 4.06 5.31 5.42 5.42 5.10 5.42 5.10 6.56 7.18 7.18 7.20	5, 28 8 74 8 5 42 7 08 5 7 08 5 7 08 5 7 08 6 6 6 60 6 60 6 6 10 5 8 8 7 4 9 5 6 9 6 10 5 5 8 3 5 14 6 5 6 3 6 6 6 3 6 6 6 3 6	\$ 94 9 84 6 09 7 97 7 97 8 12 7 56 8 12 7 56 6 40 6 71 7 98 8 12 7 56 6 40 6 71 7 8 12 8 91 6 75 8 94 7 8 97 8 98 8 97 8 98 8 97 8 98 8 97 8 98 8 98	13. 7 13. 8 10. 8 10. 10. 10. 10. 10. 11. 10. 12. 13. 14. 8. 10. 11. 8. 9. 8. 13. 7 8. 8. 7 9 7

Weight of glue per square foot. Blood Albumen about 0.3 oz. Certus about 0.4 oz.

same direction, this type of structure is not plywood in the

same direction, this type of structure is not phywood in the true sense. There are usually but 4 to 6 lammations, each being ½ to ½ in. in thickness. The extra weight of these struts due to the glue is a disadvantage.

Certain kinds of strut frames, such as the "N" type for cabane struts, or the portal for interplane struts, which are capable of taking moment at the corners, and so may replace diagonal or incidence wires, are a combination of laminated and plywood construction. In each member of the frame, for the greater part of its length, the grain of all the laminations is parallel to the direction of the stress, but at the intersection as paramet to the direction of the stress, but at the intersection of the members the laminations are dovetailed, producing a plywood construction in which the grain of the adjacent plies is nearly at right angles. A unit frame of this type has considerable rigidity, but is appreciably heavier than the usual combination of single struts and wires. From the military point of view, one of its chief advantages is its ability to trusses, should one of the trusses be shot away, to the uninjured truss. The elimination of drift and incidence wires reduces to a certain extent the air resistance, especially with high speed planes. Another advantage of considerable importance obtained with this type of bracing is the ease with which a wing cell may be aligned. The stagger of the wings, and the decalage, if there is any, is practically fixed. However, in case it is desirable to alter the stagger for some reason, this feature is a disadvantage.

(The writer wishes to acknowledge the value, in the preparation of this article, of certain reports issued by the Forest Products Laboratory for the Bureau of Aircraft Production.)

LIBERTY

A TRADE-MARK REGISTERED BY TH By CAPTAIN WILLIAM L. SYMO

A CERTIFICATE of registration of the trade-mark "Liberty" as used on aeroplane engines was granted by the United States Patent Office to the by the United States I atent Office to the United States of America on June 17, 1919. This is the first instance of the Government of the United States regis-tering a trade-mark under its own trade-mark laws, or the laws of any other country, although other governments have country, although other governments have registered their marks in the United States Patent Office for the goods on which they are used. The Republic of France has registered marks used on cigarettes, and several registrations have been granted by the United States Patent Office to the Imperial Government of Japan. Some government activities, such as the War and Wany Depstrment's Commission on Training Camp Activities, trade-marks.

Kverything connected with the history of the mark "Liberty" as used by the United States on its aeroplane engines is cials soon, saw that it unique. When the Liberty engine, was protect the name. Afte

first developed in the si was referred to by the neers as the "United Sta craft Engine" or the Standard Engine. ever, selected the right district offices of the Bi Production, which was ment Division of the S soon notified that the "Liberty" as applied to was so popular that it s to attempt to use any e word was a happy selec-

Trouble resulted in a ever, from the great word "Liberty" as appl commerce. Many man to designate their goods erty." This use of the which are of the same engines or on goods as

Citro Inc. 1



NAVAL and MILITARY AEDONAUTICS -



140,000 Miles Flown in June

The work of the Air Service of the United States Army for the month of June in cross-country flying totaled 140,000 miles. This did not include the mileage flying over fields in giving instructions to enlisted men.

Flying Circus of Seven Off On Flight to Texas

Hempstead.-Lieutenant Colonel Harry Hempstead.—Leutenant Colonel Harry B. Claggett, who left Texas some time ago to fly to Boston on a recruiting tour of the Eastern States, left July 12 on the return trip to Texas with his flying circus of seven. The first stop will be made at

Washington. In the leading plane was Colonel Clag gett as pilot, with Captain William H. Chaudler as observer. Behind them come Chandler as observer; bennnt them come in order, Major John W. Simmons, pilot, with Sergeant Harry H. Altman as observer; Major Roy S. Brown, pilot, with Captain Herman Fluegel as observer; Captain Herman Fliegel as observer; Lieutenant J. E. Duke, Jr., pilot, and Ser-geant Wayne Wetzell, observer: Lieutenant Benjamin H. Adams, pilot, and Ser-geant James C. Smith, observer; Major geant James C. Smith, observer; Major Henry J. F. Miller, pilot, and Lieutenant Henry J. F. Miller, pilot, and Lieutenant M. John Plumb, observer; Lieutenant Robert F. Medkill, pilot, and Sergeant Ralph Kratz, observer.

Night Altitude Flight

An experimental flight for altitude at night was conducted at Carlstrom Field, Arcadia, Fla, at 10 o'clock, July 10. Lieutenant Charles C. Chauncey in a Le Pere with Sergeant Thomas Cook, as passenger, reached an altitude of 20,000 feet without difficulty.

The weather was clear, the wind from

the northwest, speed ten miles per hour, and the thermometer in the rear cockpit of the aeroplane registered five degrees below freezing point. The duration of below freezing point. The duration of the flight was eighty-five minutes. At 10:05 P.M. the two airmen observed a second sunset.

Army's Non-Stop Record

Announcement was made since early in April army fliers in this country have made eleven non-stop flights, each ex-ceeding 500 miles. The longest was made by Major Theodore C. Macaulay and measured 852 miles. The fastest was made by Lieutenant R. S. Worthington, who covered 500 miles at an average speed of 166.62 miles an hour. In the same period army fliers have made several trans-continental flights and other long flights in which there were intermediate stops of less than 500 miles each. The record-

of the notable long non-stop lights is:
April 12. Theo, Macanlay and Sergeant A. W. Allman in a De Haviland-4,
from Fort Worth, Texas, to El Paso, Texas, 580 miles, in 345 minutes; 100.86

Texas, 500 miles, in 375 miles per hour.

April 14. Theo. C. Macaulay and Sergeant A. W. Allman, in a De Haviland-4, from Tuscon, Ariz., to Sweetwater, Texas, 701 miles, in 345 minutes: 121.86

Texas, 701 miles, in 345 minutes; 121.86 miles per hour. April 16. Theo. C. Macaulay and Sergeant A. W. Allman, in a DeHaviland-4, from Fort Worth, Texas, to Americus, Gas, 852 miles, in 415 minutes; 123.18 miles per hour. April 19. Captain E. F. White and H. M. Schaeffer in a De Haviland-4, from Chicago to New York, 725 miles in 350

minutes; 133.80 miles per hour. May 4. Captain Roy N. Francis, Major

W. H. Frank, Lieutenant Coe, T. E. Gilmore and Lieutenant E. E. Harmon, in a U. S. Martin bomber, from Washington to Macon, Ga., 650 miles in 470 minutes;

to Macon, Ga., 630 miles in 4/0 minutes; 82,98 miles per hour. May 17. Colonel G. C. Brant and Lieu-tenant H. Birkett, in a De Havilland-4, from Houston, Texas, to Belleville, Ill., 720 miles in 453 minutes; 114.8 miles per

Lieutenaut G. H. McKay, in a Curtiss JN-4H, from Belleville, Ill., to York, Neb., 500 miles, in 343 minutes;

86.04 miles per hour. June 17. Howard Rhinehart and J. E. Talbot, in a De Haviland-4, from Day-ton to Mineola, 502 miles in 250 minutes: 120.48 miles per hour.

June 17. Lieutenant R. S. Worthington, no passenger, in an SE-5, from Palo Alto to San Diego, 500 miles in 180 min-utes; 166.62 miles per hour.

utes; 166.62 miles per hour.
June 24. Lieutenant G. H. Palmer,
Lieutenant G. E. Bradford, and five me-chanics, in a Handley Page from Indian-apolis to Washington, 505 miles, in 285 mitutes; 106.26 miles per hour.
July 7. Captain Lowell H. Smith, no passenger, in a De Haviland Bluebird, from San Francisco to San Diego, 610 miles, in 2465/ mitutes; 148.44 miles per hour.

San Francisco-San Diego Record

A telegram has been received from San Diego, California, stating that Captain Lowell H. Smith, flying alone in a De Haviland "Bluebird," broke the non-stop speed record July 7 between San Fran-cisco and San Diego by flying the distance of 610 miles in 2461/2 minutes, which is at the rate of 148.44 miles per hour.



Lieut. Col. Netherwood, commanding officer of the Aviation Rep Depot at Dollas, Texas

THOMAS H. INCE OFFERS TRANS-PACIFIC FLIGHT PRIZE

*HE Aero Club of America has san tioned the contest for the \$50,000 prize offered for the first trans-Pacific flight by Thomas II. Incc. The rules and regulations for the contest are

"Thomas H. Ince offers the sum of \$50,000 to the aviator who shall first complete an aerial voyage across the Pacific Ocean in a heavier-than-air machine, meocean in a newter-than-art machine, me-chanically propelled, of any size and type. Said flight may be attempted from either side of the ocean, but if westward the starting place must be from the Thomas H. Ince Aviation Field at Venice, Cal₂ or the Thomas II. Ince Hydroaeroplane Station at Venice, Cal., and the finish must be on the mainland of the Japanese group of islands or the mainland of the Phil-ippine group of islands or the con-tinent of Asia; if eastward, the mainland of the Japanese group of islands or the mainland of the Philippine group of islands or the continent of Asia, and the islands of the confinent of Asia, and the finish must be on the mainland of the United States of America. The course of said flight must be confined to latitudes 49 degrees north, and 32 degrees, 33 minutes, north, of the United States of America, and the the confinence of the United States of America, and the confinent to the United States of America, and the confinence of the United States of America, and the confinence of the United States of America, and the confinence of the United States of America, and the confinence of the United States of America, and the confinence of Asia, ica, and latitudes 41 degrees, 35 minutes, 20 seconds, north, and 38 degrees, 45 minutes, south, of the Eastern Pacific.

"The contest will be conducted by the Aero Club of America, through its official affiliation and representative, the Pacific Aero Club, and shall comply_with the rules and regulations of the Federation Aeronautique Internationals,

"Time Limit
"The contest shall be confined between the months of September, 1919, and February, 1920, inclusive, and contestants must complete the trans-Pacific flight within two hundred and eighty-eight (288) hours from the time of starting. Awarde

"In the event that no contestant shall successfully complete a trans-Pacific flight, for which the sum of fifty thousand (\$50,000) dollars is offered, the contestant starting from the Thomas H. Ince Avia-tion field at Venice, Cal., or the Thomas H. Ince Hydroaeroplane Station at Venice, Cal., who shall have reached the Hawaiian Islands in the shortest length of time, shall be awarded the sum of ten thousand (\$10,000) dollars; and in the event that no contestant shall complete a flight to the Hawaiian Islands, the contestant starting from the two above-men-tioned places who shall fly the furthest in the direction of the Hawaiian Islands shall be awarded the sum of five thousand \$5,000) dollars.

Qualification of Contestants "The contest is open to persons of any nationality holding an aviator's pilot linationality noting an avaitor's piot re-cense issued by any accredited aero club affiliated with the Federation Aeronau-tique Internationale, or to persons who have been so rated by any military or naval establishment.

Entries "The entry form, which must be accompanied by the entrance fee of \$500, must be sent to the secretary of the Pacific Aero Club, Monadnock Building, San Francisco, Cal., at least fourteen days be-fore the entrant makes his first attempt. No entrance fee will be required of any military or naval contestant. Foreign entries will make application to the clubs in their respective countries which are af-



Thomas H. Ince signing his personal check for \$50,000, which he presented to the City of Venice, Cai., with which to pay the first aviator to crose the Pacific

filiated with the Federation Aeronautique

"No part of the entrance fees are to be received by Thomas H. Ince. All such entrance fees will be applied toward payment of the expenses of the Pacific Aero Club in conducting the contest. Any balance not so expended will be refunded to

the contestants pro rata.

The start of contestants may be made from land or water, but in the latter case the contestants must cross the coast line at the beginning and end of flight. The time will be taken from the moment of leaving the land or crossing the coast line. Each contestant shall advise the Pacific Aero Club of the proposed date and time of his start, as all starts must be made under the supervision of an official or officials of the above-mentioned club.

Ninety-five per cent of the mileage traveled from starting point to finish must be accomplished in the air. Barographs, officially sealed, shall be attached to each aircraft before starting, and opened only in the presence of an accredited repre-sentative of the Pacific Aero Club. The recordings of these barographs shall determine the air mileage actually traveled.

Towing
"Towing is not prohibited.
"Stops and landings, either on the water or at any point en route, may be made by the contestants.

Identification of Aircraft 'Only one aircraft may be used for each attempt. It may be repaired en route. Each aircraft will be so marked before starting that it can be identified on reaching its destination.

Fintsh "The finish may be made on land or water. The time will be taken at the moment of crossing the coast line in flight or touching land. Each contestant shall advise the Pacific Aero Club of his pro-

advise the Pacific Aero Club of his pro-posed destination and alighting place.

"(1) A contestant hy entering thereby agrees that he is bound by the regulations herein contained or to be hereafter issued in connection with this contest. "(2) The interpretation of these regu-

lations or of any to be hereafter issued will rest entirely with the official committee of the Pacific Aero Club.

The contestant shall be solely responsible to the officials for the due observance of these regulations, and shall be the person with whom the officials will deal in respect thereof, or of any question out of this contest.

"(4) A contestant by entering waives

any right of action against the Federation Aeronautique Internationale, the Aero Club of America, the Pacific Aero Club (Continued on page 906)

A view of Venice, Cal., from whence the aviatore will fly far the lace \$50,000 prize



FOREIGN NEWS



Noted Swiss Flier Killed

Oten Bider, reputed the leading Swiss filer, was killed July 5 in a fair from a bright of 3,000 feet year Zurich. Bider, who was the chief a public exhibition. Owar Bifer was one of the first to By across the Bernes Alps, baving made several trips over the mountains in 1913. In the same year he flow across the Pyreness from Fan, France, to

A New British Rigid Alrehip

According to notice appearing in the daily press, the new rigid airship, R3/9, now under construction at the works of Sir W, G. Aras-strong Whitworth & Co., Ltd., Barlow, near Schly, Yorkshire, is to have an overall length of 658 feet, a maximum diameter of 83 feet and of 350 horterpower each, and it is hoped that the speed attained will be over 70 miles per hour.

A 900 H.P. Sunbeam Engine

According to the Deily Express of May 11th, the Sunbeam Motor Car Co., Ltd., have just made preliminary tests of a new 12-cylinder "Vee" type engine of 900 normal b.h.p. No other information is as yet available.

Aerial Progress in Australia

Mr. R. Lister's series and arterials and arterials and arterials are series are properly by a series across properly by a series across convergence of the Galler of Carpennana. They becared acrisi landing from Sydney to the Gall of Carpennana. They becared acrisi landing root that a chain of landing stations from Sydney through Ouerchald and all the Galler of the complete of arterial arterials are considered acrisis and across the control of the Carpennana and the Carpennana are completely as a series of the Carpennana are considered as a series of the Carpennana and across the control of the Carpennana are considered as a series of the Carpennana are considered as a series of the Carpennana across the heart of the Northern Territory.

Civil Aviation in Brazil

According to deta Personne, cold Advants in Denall
According to deta Personne, cold My 18th, the Brazilian Minister of
Comminications has authorized the gubblishino of official instructions
(The principal policy of the property of the pro

Aerial Picasure Service in England

It is understood that arrangements have now been completed for an aerial pleasure service to be run at Brighton during the summer. Land for the machine to use "The Ladies" Mist," at the north cent of the town as a landing ground. A rental of £15 per season will be charged for this ground, and each sepathae will be charged 10s, per week.

An Interesting Career

The fame of the Bulls-Royce engine, to which the trans Atlantic flight has added forther harrels, makes interesting the electivity of the man reaponsible for its ereasion. Yet of all the men whom the resistance movement has pushed into the limitigate of prominence, it is, doubtful received by the properties of the pr

if there be one whose personality is to unknown as Mr. F. Henry Regress. M.M. M. H. F. L. Core. To whether the property of the

chester. From very small beganings, making are lamps and dynamic, the tiers indeceptedly hazarches out into chestromotors and electrically the tiers indecepted to the side. The property of the control of the control of the control of the control of the side. The transport of the control of

In South Africa

A commercial aviation compared with a milital capital of £10,000 has been started a johanniam, with an milital capital of £10,000 has been started a johanniam, with an milital capital of the part between Johanneaburg. Privoria, Maritaburg, and Durlan. The largest marker will carry 2 passenquers and about 500 sounds and about 500 sounds and be estimated at present, will be about £10, and the parcet rate Is port II. As soon as regular services are in operation the company will be proportionally an experiency by the comparison of the times taken respectively by train and estimated to be taken by acceptance between aviations toward.

By Train. 4734 hr. 24 hr. 80 min.

Capetown to Pretoria, 1,001 miles. 474 hr. 3 hr. Durhan to Pretoria, 190 miles. 474 hr. 3 hr. Durhan to Pretoria, 191 miles. 48 hr. 4 hr.

In Brazil

The Brazilian Minister of Transport has instructed the Department of Maritime and River Transport to study the conditions of aerial transport in order to draw up regulations regarding aerial navigation in Brazil. It is reported that an Italian-Brazilian company has been formed for the purpose of establishing aerial communication in Brazil, and have entered into negotiations for concessions to that end from the Ministry

of Transport.

It is prospect to consucere with a service between Rio Grande and
The machines to be used will be Caproni senginare—"much less
The machines to be used will be Caproni senginare—"much less
Concensions have been granted by the Hegalina Government to
Senors Josos Leatrin Soures and Autonits Rougil to institute sergial
12,246, (tephew 7, 1918).

Simple of the Capronic Source and Autonits Rougil to institute sergial
12,246, (tephew 7, 1918).

Simple of the Capronic Source and Autonits of Arrapis Goat to me
serial means of transport—uncluding seaphones for the transport of
passengers and goods in Brand.

New Swedish Aerodrome

It would appear that Sweden is really out to develop commercial aviation. A message from Cothenburg states that negotiations are being carried on for the purchase of a number of farms on the island of Hisingen, opposite Eichhenburg, with the object of establishing a flying port

To Check Farest Fires

Definite steps are now being taken; in the direction, of organized, the property of the proper

Aircraft Insurance Profils to be Divided

. 8 . .

Portable Hangars for J.N.-4 Curtiss

Best of Material and Workmanship. Fit like the glove to the hand. Simple as A-B-C



AIRPLANE in hangar. Note room for camp beds at each side under top plane. Front wall closes on cable at top and lashes in centar. Non-detachable pegs at bottom make it wind and rain



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(Continued from page 888) national advisory committees were constituted to study these subjects as follows:

1. Mechanical Tests. Definitions of terms used in the heat treatment and testing of steel.

Analysis. Methods of 2. Chemical analysis of metals for use as a reference.

3. Tolerance on Bars. (For sizes of bars in both metric and British measure.) 4. Magnetos. Interchangeability of com-

plete magnetos, 5. Sparking Plugs. 6. Propeller Hubs. Interchangeability, Interchangeability of propeller and hub. 7. Ball Bearings.

7. Ball and sizes. Interchangeability 8. Axles, Hubs, Rims, Tires, Inter-

Axies, riuos, kims, rires, inter-changeability and sizes.
 S. Electrical. To consider what elec-trical apparatus should be interchangeable.
 Steel Tubes. Interchangeability and

sizes. 11. Tests on Wood. To obtain agreement on methods of tests,

These advisory committees will meet from time to time in order to prepare proposals which, after having been re-ferred to and agreed upon by the national committees, will be submitted to a plenary meeting of the Commission for adoption and issue as International Aircraft and issue Standards.

Note in Regard to Formation of

National Committees

In most countries there now exists, or is in process of formation, an Engineering Standards Association, the object be-ing to centralize, as far as possible, in one authoritative organization the standardization of engineering and allied materials. Such bodies are generally divided into various Sections dealing with the different branches of the engineering and

allied industries. For instance, in France, Great Britain and the United States, the Committee of the Standardizing Author-Committee of the Standardizing Authorizing for the country, controlling the aircraft section has been officially nominated as the National Committee of the International Aircraft Standards Commission, In the case of Great Britain, the British Engineering Standards Association has 24 Sectional Committees controlling has 24 Sectional Committees controlling the national standards of all kinds of engineering and allied material including an Aircraft Section. The Aircraft Sec-tional Committee has some 60 Sub-Committees and has in operation over 200 Specifications for signeral functions. 200 Specifications for aircraft materials, prepared and kept up to date by these Sub-Committees. This Section being now the British National Committee of the International Aircraft Standards Commission, it has therefore at its dis-posal the work of all these Committees as well as the work of every other Sec-tional Committee interested. This plan is being adopted in America and France and seems likely to be universally adopted.

(Continued from page 899)

or Thomas II. Ince for any damages sustained by him in consequence of any act or omission on the part of the officials of any of the above-mentional clubs or Thomas H. Ince or their representatives or servants or any fellow contestant.

"(5) The aircraft used shall be at all

"(5) The aircraft used shall be at all times at the risk in all respect of the contestant, who shall be deemed by entry to agree to waive all claim for injury either to himself or his passengers or his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the above-mentioned clubs and Thomas

Personal Pare

William Knight, formerly assistant me-William Anight, formerly assistant me-chanical engineer of the Crocker-Wheeler Company, Ampere, N. J., and during the war a first lieutenant in the Air Service, U. S. A., has recently been appointed etchnical assistant to the National Ad-visory Committee for Aeronautics in Europe, with headquarters in Paris, France.

H. R. Trotter, formerly chief engineer of been appointed chief engineer of the engineer of the property of the state of th Company,

G. Edward Barnhart has resigned as chief engineer in charge of the production of Handley Page planes at the plant of the Standard Aircraft Corporation, Elizabeth, N. J., and has accepted the position of mechanical engineer in the experimental engineering department of the B. F. Goodrich Co., Akron, Ohio,

Edward L. Jones, who has been associated with the sales departments of the Remy Electric Co. and Standard Parts Co., has been appointed special factory representative of the Perfection Heater & Míg, Co., Cleveland, Ohio,

O. F. Kropf, secretary-treasurer, Findesen & Kropf Mfg. Co., Chicago, Ill. has been elected president of the recently formed Beneke-Kropf Mfg. Co. The new organization has succeeded the Findesen & Kropf Mfg. Co. and will continue the manufacture of the Rayfield carbureter.



Vol. 9, No. 20

JULY 28, 1919

10 CENTS A COPY



The Aerial Pathfinder

Air Department To Be Urged



The Supreme Ignition Test

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VOL. IX

NEW YORK, JULY 28, 1919

NO. 20

LARGE DEMAND FOR AEROPLANES

HERE are over 500 people who have purchased or or-dered an aeroplane in the United States during the past three months, and not less than 500 more are anxious to place their orders but cannot do so because the manufacturers are rushed with orders and cannot promise deliveries.
This is one of the important facts ascertained by the com-

Inis is one of the important facts ascertained by the com-mittee in charge of organizing the Pioneer Aeroplane Tours. The Curriss Company alone has orders for over three hor-dred aeroplanes, and is so rushed with prospective orders that it has found it necessary to put on two shifts in its fac-tories at Garden City and Buffalo.

tories at Carden City and Buffalo. Over 130 orders have been received by the Curtiss Company for the pleasure type biplane called the "Oriole," because it is painted like an oriole. The Curtiss Company already has more orders than it can fill this summer for pleasure type seaplanes of the type called the "Seaguli". The Curtiss factories are turning out an average of one a day of both the "Oriole" and "Seaguli" types. The orders for planes range from the one-passenger type to the ten-passenger type, with a few orders for larger machines. The passenger carrying

business is also flourishing and there is a large demand for aerial passenger carrying transportation lines. Every day people wait in line for an opportunity to take a flight in a flying boat down the Boardwalk toward the Inlet, where there are three flying boats in operation, carrying passengers from morning till night. It is a common sight to see a man or woman in a hotel talking wildly and waving their hands to illustrate the motions gone through in making an aeroplane flight with one of the aviators at the Atlantic City Airport. It is unfortunate for the aeronautic movement that the man-

at 13 uniorunate for the aeronaute movement that the manufacturers are not in a position to make the necessary deliveries of aeroplanes. Not less than 2,000 pleasure machines could be sold immediately if the manufacturers were in a position to make deliveries.

position to make deliveries.
Fortunately for the aeronautic movement, the several thousand planes which the Government has sold and other planes which the Army and Navy may sell in the near future, will soon be available. They will be available for the Tours, which promise to start with a surprisingly large number of entries

DEMORALIZING THE ARMY AIR SERVICE

NLESS some sudden readjustment occurs the Army Air Service faces absolute demoralization, and all of the Service taces ausoitte desired two years, and the money upbuilding work of the past two years, and the money republished the past two years, and the money upbuilding work Times expended, will have been for nothing.

"The Air Service of the army faces demoralization as "The Air Service of the army faces demoralization as a result of orders issued by Secretary Baker, through the Ad-jutant General of the army, calling for the discharge of all temporary officers in the army by September 30. Secretary Baker and General March found themselves confronted, as a result of the islankes made by the Republican Congress, in the estimates for the support of the army, to order the dis-charge of all emergency appointment officers on or before September 30. The result will not only rob the service of some of its best filters who entered from civilian life, but also

some of its best iners who entered from civinan ine, but also force the abandoment of important army aviation projects only for army aviation. Men in charge of plans for army aviation development asserted that the army plans called for a minimum of \$55,000,000 for the current fiscal year, or a maximum of \$55,000,000.

With the discharge of all temporary officers by September of the army aviation stations in Hawaii and Panama will have

30 the army aviation stations in Hawaii and Panama will have to be abandoned, as well as the proposed Philippine aviation project, as there will be scarcely enough regular army officers was asserted by officers of the Aris Service that as a result of the situation now string; it in the face, no provision can be made for properly taking care of the millions of dollars' worth of aviation property at Government fields and in stor-age ports, that it will be impossible for the army to maintain

a proper system of aviation coast defense, that it will not have sufficient fliers left to properly train personnel, that it will be without a proper administrative or executive force, and will be without any lighter-than-air facilities for more than one company.

"Men prominently identified with the army and interested in are prominently identified with the army and interested in aviation regard this condition of affairs as being nothing short of deplorable. It is estimated that it cost the Government more than \$10,000 a man to train its filers. Ten filers who entered the army from civil life for the period of the war have already signed contracts to go with private companies at approximately \$100 a week to fly and do stunts at State fairs and in other kinds of exhibitions. These were lieutenants who were willing to remain in the army air service at \$1,700

"On July 12 the Army Air Service consisted of 4,851 of-The state of the s there are only 222 regular army officers in he Air Service. The rank and status of these regular army officers are:

> Fliers, Nonfliers, Major Generals 2 Brigadier Generals olonels 17
> ieutenant Colonels 50
> lajors 50 19 21 Majors 66

Captains			 									3	. 6
First Lieutenants											. (5	4
Second Licutenant	ts		٠					,					
											-	-	
Tartale											2 14	0	72

"This total includes thirteen who are balloonists and six who are observers. The officers now available in the United States are:

Fliers																		1,269
Non-fliers Balloonist	•			:		:		:		٠	:		:	:				1,378
Total																		decrees to

"The great bulk of these, however, are temporary officers, who will be discharged from the service before September 20. The 222 officers of the regular establishment to be retained are not enough for three squadrons, exclusive of officers detailed for training, coast defense, and insular possessions. Projects having the approval of the army as of July 12, which will of necessity, it is asserted, have to be abandoned if the present orders for discharge of all temporary officers stand,

"Philippine project calling for four observation squadrons— Each squadron of this project called for a war strength of 45 officers, of which 41 would be fliers; total required, 164 fliers and 16 non-fliers.

"The Hawaiian project—One squadron already stationed there, two more authorized; total required, 123 fliers and 12 non-fliers.

"The Panama Project—One squadron, already stationed there, two more authorized; total required, 123 fliers and 12

non-fliers. "The Border Patrol—Two squadrons operating, four more authorized: total required 246 fliers and 24 non-fliers.

"These projects alone required (56 fleet and (4 non-fleet, "Forty-way labloot companies also were amborized and contemplated in the arms plane. These called for eight offerer for each coupany, of which five were to be observer. The total number of officers required for approved projects was: Heavierthanair, (56) fleet, (4 non-fleet, lighter-thanair, 20) fleet, 120 non-fleet. Total required, (86 fleet, 190 non-fleet).

"To meet this there is at present a regular army strength of 222 officers, consisting of 130 heavier-than-air pilots, 18 balloon pilots, 6 observers, 73 non-fliers.

"If existing orders are carried out the shortage on September 30 will be: Heavier-than-air pilots, 526; lighter-than-air pilots, 197; non-thers, both branches, 117. Total, 840.

pilots, 197; non-thers, both branches, 117.—Lotal, 840.
"This is the situation that has created demoralization in the
Air Service of the army."

AIR DEPARTMENT TO BE URGED

SECRETARY OF WAR BAKER will be strongly urged soon to recommend to President Wilson and to Congress that control of aviation he taken from the army and navy and centered in a new department that may be headed by a cabinet nember.

by a cabinet member.

This statement was made to pepresentatives of the New York press by members of the Aircraft Mission that returned on the Agnitania after an extensive tour of the aircraft factories in longland. The mission comprised: Assistant Secretary of the Aircraft Mission of the Assistant Secretary of the Aircraft Assistant Secretary of the Aircraft Assistant Secretary of the Aircraft Corporation, C. W. Keyes, of the Curtis Aerophae and Motor Corporation, and S. S. Bradley, general manager of the Manufacturers' Aircraft Association.

"What we have seen abroad during the last several months has convinced us of the absolute recessity of a radical departure by America in aviation," said one of the group. "The War Department may be expected to recommend, and the Navy Department undoubtedly will concur, that aviation he the army and navy."

"The new Government Department of Aviation, to call it that for the moment, is to have control of all aviation in this country, including commercial enterprises in the air. In time of war the War Department can requisition the Aviation Department for so many planes and dirigibles and balloons, and the Navy Department can do likewise. In time of peace

the new department can direct the development of American aviation, military, naval and commercial.

"If we are to catch up with the European nations, who have already far outstripped us in that field, and who are drawing further away every day, we must adopt this new program of

"Though the NC-4 made the first trans-Atlantic flight, the fact remains that it is Britain that has achieved the great successes of the air in recent months. And Britain's aviation program is almost spectacularly tremendous. France, too, is ambitious, and Italy is ahead of us.

"It is discouraging to those of us who have been in close contact with Europe's great program and brilliant air progress to learn that Congress is spatience to our own avaiton development. The thousands of resignations of aviators from There is no doult whatever in the minds of those who have participated in this war, particularly those who have themselves been in America's air service, that the future, both in war and in peace, will find valution a supreme factor in slaparity of the suprementation of the suprementation of the afford to be a laggard if we are to retain our position among the great power.

"There is also to be considered this important fact, that eration of a new department to take over entire control of all American aviation would do away with duplication of expenditures and result in a saving annually of hundreds of millions, perhaps billions, of dollars."

SPOKANE OFFERS EXCELLENT FACILITIES TO AVIATORS

No city in the United States is more keenly alive to the possibilities of aviation than is Spokane. Already marked progress has been made, and well defined plans are a foot to place flying on a practical, commonseuse basis. The Spokane Flyer's Club has been launched with a mem-

The Spokane Flyer's Club has been launched with a membership of 30, all former officers in the army aviation service. Some of the members have flying records of 500 to 1,000 to hours. It is believed the membership will shortly be 50. One aeroplane has been surchased, a Curtiss training machine, so that members may keep in training.

The personnel of the Spoksure Flying Club, together with 60 other ranks from the army aviation service, form the first National Guard aviation squadron to offer its services to the Covernment. The organization is complete and ready to "carry on" as soon as Congress supplies the necessary wastern, which was considered to the Covernment of the National Guard aviation in the National Guard aviation.

A commercial aviation enterprise has been launched, and four machines have been ordered to start with. Spokane

boasts a magnificent aviation field in Parkwater, on the ousierts of the city, where a two-wax field of 500 acres office landing grounds said to be unsurpassed in the United States. The Flyers' Club and the commercial enterprise will locate their langars at Parkwater. The club langar will include a practical work-shop where members will have an opportunity present models. Several Spokane aviators have important innovations they are axistous to test out in practise.

Spokane is especially favored climatically for aviation, log is almost unknown, and the clarity of the air all the year round has been emphasized by experts in the moving picture trade.

This city is strongly recommended as a center for aeroplane loady building. The choicest spruce is available in immense quantities, electrical power is plentiful and low in cost, and the city is exceptionally free from labor troubles, while the cost of living is comparatively very low. Any legitimate cutterprise will have the strongest endorsement and support



THE NEWS OF THE WEEK



Aircraft Entertain Spectators at N. Y. Police Tourney

Sheepshead Bay, N. Y.—A large num-ber of army planes, headed by a huge Handley-Paige bomber, participated in the events at the field days of the New York Police Force. Commander John H. Towers and Lient, Commander Patrick N. Bellinger were taken to the field in army aeroplanes. Exhibtions of formaarmy aeroplanes. Extion flying were given.

C. F. Kettering Covers 800 Miles in Fast

Dayton, Ohio.—Maintaining an average speed of 1033 miles an hour, in spite of a direct head wind, all the way east from St. Louis, Charles F. Kettering, inventor, returned home today from a convention at Wichita, Kan. The De Haviland machine, piloted by Howard Rinchart, landed at South Field, Dayton, on July 19th, at 3,15 F. M., having covered 800 miles in the property of the control of the property of the control of the c seven hours and forty-five minutes.

Dirigible R. 33 to. Fly to India.
The British dirigible R. 34, inter ship of
the R. 34 inter ship of
t speed.

Missionaries to Buy Curtiss Flying Boat for Use in Africa

A flying boat or an aeroplane may soon form a part of the equipment of modern missions in blackest Africa, according to a letter received yesterday by the Curtiss Aeroplane and Motor Corporation.

The letter was from the Congo Mission of the Disciples of Christ, the headquar-ters of which is at Coquilhatville, Belgian

Congo.
"We are interested in the matter of the purchase of flying boats to replace wholly or in part the fleet of launches which we have been planning for service in com-munication between our various stations," the letter stated. "We have a large river the letter stated. "We have a large river steamer for transportation between sta-tions which hydroplanes might supply. Our area is about 500 miles east and west and 200 miles north and south in extent. The whole area is covered well by an extensive system of waterways. In inland points landings might be made in small machines in the straight, smooth, central streets of the native towns, which in this section are usually clear of grass and other obstructions and are not less than 100 feet wide."

What the untamed congregations will think of the innovation is a matter of conjecture only.

Memorial to McConnell Unveiled

A statue to Lieut. James Rodgers Mc-Connell, an American aviator killed in Connell, an American aviator killed in France in 1917, was inveiled at the Uni-versity of Virginia. The statue, which is based on the legend of Daedalus, the Greek, was executed by Gutzon Borghem, and represents his interpretation of the "Spirit of Aviation."

Championship Balloon Race to Start From St. Louis A balloon race for the United States

championship will start from St. Louis October 1. The race will be conducted October 1. The race will be conducted by the Missouri Aeronautical Society im-der the rules of the International Aero-nautical Federation. The first prize will be \$500, the second \$300 and the third \$200.

Raynham Ordered Home, Abandons Flight Plan

Captain Frederick P. Raynham, the British aviator whose Martinsyde biplane was wrecked twice in two months spent in trying to start a trans-Atlantice flight. has received orders to abandon further attempts and return to England. Rayn-ham and his navigator, Courad H. Biddlecomb, directed the crating of their plane, and both expect to leave with it on the steamer Grampian. Their mechanics will return to England with them.

Aeroplane to Revolution Baseball nize Professional

New York, N. Y .- Commenting on the flight of a former professional baseball player from Colombey-les-Belles to Treves to umpire a game between two teams of the Seventh Division, John J. McGraw, the manager of the New York National League Baseball Club, predicted that aerial transport would revolutionize professional haseball.

"It certainly will make the job of con-structing schedules an easy one," said Mr. McGraw. "At the present time trains and distance have to be considered most carefully, and in forming a circuit certain towns are automatically eliminated tain towns are automatically eliminated because they are too far away. It looks as if some day a team might be able to leave New York early enough in the morning to play in Pittsburgh, Chicago, or even St. Louis that afternoon.

San Francisco might be able to become

a member of one of the major leagues. San Autonio might play in the Connecti-cut League or Hartford in the Texas League. Twenty years from now we might be able to form a League of Nations, with London, Paris and Rome as members.

Three-Motored Monoplane to Attempt Trans-Atlantic Flight

Los Angeles, Cal.-George D. White, aeronautical engineer and head of the George D. White Company of Los Angeles, recently announced that he proposes n the near future to attempt to cross the Pacific Ocean in a 660 horse-power triple motored monoplane which he is now planning to build.

Relative to his route across the Pacific Mr. White said he had considered this from many angles and is convinced that a northern route by way of Alaska and Kamchatka would be the better under present conditions. With his machine Mr. White proposes to cover 7,000 miles, jumping off from Los Angeles, touching yumping off from Los Angeles, touching at San Francisco, Victoria, British Colum-bia, Sitka, Unalaska, Petro Pavlosk, Yoko-hama, and finally Shanghai, the end of the flight.

The northern route, it is estimated, will take three days, according to the plans

take three days, according to the plans from Los Angeles to Japan, a trip now requiring three weeks on the fastest hoat.

Mr. White points out that it will be an independent flight and that his effort to be the first across the Pacific Ocean will not be so much an attempt to win the \$50,000 prize offered by Thomas H. Ince as it will be to prove the reliability of the White monoplane.

To Build Dirigible at Philadelphia Yard

Philadelphia.—A dirigible similar to the British R-34, to be built at the navy yard here, will attempt within a year a flight to Europe, Commander Coburn, in charge of aircraft production for the navy at this



An experimental hiplane constructed by the Farman Company. Note the method of mounting the two radial motors and the propeller shafting

point, announced. He also made public plans of the department to establish a landing field at Lakehurst, N. J., with hangars capable of housing balloons larger than any yet built.

Ships to Aid Flyers Vessels will give longitude and latitude

to trans-Atlantic flyers whenever occasion arises, if suggestions made by the Na-tional Advisory Committee for Aero-nautics of the U. S. Shipping Board are

carried out. The Advisory Committee has recommended that all ships flying the American flag should be instructed to give all navigation assistance of this nature at all times n the future to trans-Atlantic flyers, and has asked the U. S. Shipping Board to convey the recommendations to all oceangoing vessels carrying the flag of the United States.

No Part in Aircraft Standards As a result of action by Congress the plans for American participation in the International Aircraft Standards Commission Conference have been dropped. This conference, which was started during the war when delegates from all of the allied countries met in London and con-ferred on problems of aircraft standardization, is to be permanent, with a central

ization, is to be permanent, with a central office in London.

The provision for American participation was included in the army appropriation bill appropriation bill appropriation bill appropriation bill appropriation for the maintenance of the office and \$50,000 for the expenses of delegates. As a result of the refusal of the House to agree to the provision as incorporated in the Senate army appropriation hill, this section of the hill was eliminated and participation of America in Standards Conferences ended.

An attempt will be made next year to secure appropriations for participation of American delegates for 1921.

Seventeen Fliers Entered in Toronto-New York Race Seventeen entries and \$10,000 in cash prizes and trophies are already assured for the aeroplane flights from here to New York which are to feature the Canadian National Exposition to be opened by the Prince of Wales on August 25, at Toronto.

So far all entries for the Toronto-New York race are from the United States, but twelve Canadian entries are expected before the exposition opens. Captured German Fokker planes, now in the possession of the Dominion Government, will be admitted to the contests it has been decided, provided their pilots hail from allied countries. There are twenty-two of these

Airmen Dive Under Suspension Bridge at Niagara

Niagara Falls, N. Y .- L. H. Holmes, pilot, and S. Bonnick, aerial photographer, starting from Lake Side Aerodrome on the Hamilton Highway on July 11th made an aerial photography trip in the Niagara Falls region, taking pictures of Oakville, Burlington, Hamilton and St. Catherines, en route. After a short stay at Merritton for gasoline the Falls were reached at 4,30. Shooting over the Canadian Form and through the spray, a perilous ride commenced. With engine full open, the machine shot down at a terrific speed under the Suspension Bridge and when attempting to rise again the air current was so great that the machine had to be piloted under the next two bridges, con-tinuing down the river, narrowly missing the wires suspending the Aerial Car.

At the whirl pool the machine was still below the top of the gorge and a vertical bank had to be made at the right-angle bend in the river, narrowly missing the cliffs, and it was not until nearly at Brock's Monument that the machine rose just above the cliffs and flew into safety. Whilst Mr. Holmes was engaged in piloting the machine through the dangerous route, Mr. Bounick was taking snap shots. Both Holmes and Bonnick were instruc-tors in the Royal Air Force in Canada.

Civilian Aviators May Obtain Metero logical Information From Washington Washington, D. C.—Civilian aviators contemplating long cross-country flights in any part of the United States may now

wire the metereological officer of the in-formation group of the Air Service to find out what sort of weather they are likely to encounter, according to an an-nouncement made by the Director of Air Service. This action is one of the first which implies recognition of the great part aviation is to play in commerce of

the future.
"To assist aviators as far as possible to make their cross-country flights under favorable climatic conditions, subject to errors of a weather forecaster and witherrors of a weather forecaster and with-out assuming any responsibility for ac-curacy, the meterological officer of the information group. Air Service, United States Army, will from the weather map reports and in consultation with the offireports and in consultation with the om-cials of the United States Weather Bureau attempt to forecast weather for flying in any part of the United States for thirty hours in advance of noon each day for the aviator making a request and stating points of intended flight," the announcement says.

"The result of this experiment may de-termine the value of an aerial meteor-ological service and warrant its organization as the cross-country flying increases and aircraft become more generally used for the transportation of passengers, mail and merchandise. Aviators making a flight following the prediction of the meteorological officer are requested to advise him as soon as possible as to the accuracy of the report."

Seaplane to Carry Manifests to Liners A flying boat will carry mail to the trans-Atlantic liners when they are hours out of port, it was announced July 18 by the Post Office Department. The ex-The excided upon by Otto Praeger, Second As-sistant Postmaster General, after confer-ence with David Lindsay of the Interna-tional Mercautile Marine Company, which operates the White Star Line.

The first experiment will take place on August 9, when the Adriatic leaves New York on one of her regular trips. A mai' pouch will be dropped on her deck several hours after she leaves her pier, has been tried successfully by the United States Army and Navy in meeting troop-ships, but no commercial or postal service was ever used. The aero-marine service will save the ship many hours in geiting away, for the necessary customs and tariff papers can be delivered by airplane to the ship at sea by the new method. It has not been decided yet whether a parachute will be attrached to the pouch.

Postmaster Patten says shipping com panies regard the plan with considerable interest. Ships usually load until the last minute and then a manifest has to be prepared and filed with the Custom House as to what the vessel contains. The ship also has to have a copy of the manifest in order to dock at a European port. The time in copying and filing the manifest

will be saved by the air service.

Mr. Praeger will be present when the first aero-marine flying boat takes off the Adriatic's papers and other special aeroplane trans-Atlantic mail.

Aeroplane to Be Used on Antarctic Trip Two British aeroplane manufacturers have offered to give an aeroplane to J. L. arctic Expedition, for a flight to the South

Pole. It is declared to be Mr. Cope's in-tent to carry an aeroplane on board the exploring steamer Terra Nova, on which the expedition is to proceed until the ves-sel becomes fast from the ice.



C. Central News

onia and Sir Henry and Lady Mainwaring visiting the Handlay Page . They are axamining a land and sea plane

Night Flight to Atlantic City

A Curtiss Sea Gull flying boat recently made the first night stop between New York and Atlantic City.

York and Atlantic city, When the mechanics finished setting up the boat—ti was almost eight o'clock, but, in order to get it to Earle L. O'rigiton, manager of the Curtiss Flying Station at Atlantic City, on time, Orion W. Hoover, one of the Curtiss pilots, left Fort Washmonoulight against a heavy head wind, which made it necessary for him to land near Beach Haven for fuel. Steering by means of a beach-fire, Filot Hoover fanded the boat safely upon the

Steering by means of a beach-fire, Pilot Hoover landed the boat safely upon the sand and, after procuring gasolene, he again made a take-off with the assistance of bathers, headed the Sea Gull out to sea, took the air and made Atlantic City

at 11 o'clock.

The Sea Gull is the new three-passenger flying boat equipped with the Curtiss

150 horse-power motor.

Hoover, who is one of the most experienced pilots in the United States, took along as passengers Mr. and Mrs. C. R. Keys, of the Curtiss Engineering Corporation.

Admiral Kerr Discusses Flight

Admiral Mark Kerr, who was in charge of the Handley Page Atlantic flight expedition, accompanied by Mr. W. H. Workman, arrived at the Hotel Bitmore on July 15 from Parrsboro, Nova Scotia.

This is the second visit of the Admiral to this country, having been here in 1905, when he was in command of the H. M. S. Drake, of the second Cruiser Squadron of the British Navy, which visited these shores at that time, and was under command of the Prince Louis of Battenberg.

Admiral Kerr is the oldest aviator in the world, being 55 years of age, and he hopes to be flying when he is 70 to celebrate the twenty-first amiversary of the securing of his pilot certificate, which is not of the pilot certificate, which is not of the pinner aviators of Great Britain.

The Handley Page abandoned the Atlantic flight project in favor of a flight from Harbour Grace, Newfoundland, Atlantic City on July 4th. An oil pipe breaking in one of the four expires Camera Parrisbors, Nova Scotia, on a race course, and after making a perfect landing, came in contact with a concealed dicth which caused the machine to turn over on it can be a caused the machine to turn over on it can be a caused the machine to turn over on it can caused its flight into America or on through Canada. When Admiral Kerr collowing details: the flight be gover the following details: the flight be gover the

"The flight to Parrsboro demonstrated several things, namely, the necessity for multipled engine aeroplanes, the reliability of a machine equipped with several engines and the safety connected therewith.

"We left Harbour Grace at 6 P. M. on July 4th with a load of 230,00 pounds, the largest load ever carried by any type of aeroplane, which included the crew, consisting of Major Brackley, Major Gran, Mr. Wyatt, Engine Mechanic Arnold and Aeroplane Mechanic Elements. The material construction of the control with the material consisting and receiving instrument. All of this equipment worked admirably. The course

was laid for Sydney, which we passed at 10.15 P. M. The average speed being 83 10.15 P. M. The average speed being 83 miles per hour with an adverse wind against us. At 9 o'clock the crew had dinner in the cabin while the pilot at the wheel had his dinner brought to him, after which the off duty pilot had a few hours' sleep. At 11.30 I was piloting the machine and noticed that the starboard foremost engine was dropping revolutions and with the throttle wide open could only maintain 1,600 revolutions, and it was evident that something was wrong. Major Gran and Mechanic Arnold climbed out to the engine, but beyond finding a quantity of oil, they could not in the darkness ascertain the trouble. This feat on the part of Gran and Arnold was a very daring one and they deserve much credit for it. The engine continued to run at 1,600 revolutions until 2.05 A. M. in the morning, when one piston rod gave in the morning, when one piston rou keep out and the cam rod broke, the engine cover passed through the fuselage to other three engines now had to do all the orner three engines now had to do all the work and the throttles were open and the revolutions went up to 1,800 to 1,820. 'If they stick it out it will be the finest advertisement the Rolls Royce have ever had,' said one pilot to the other, and they did not only stick it out; but did so without a waver on the needles of the indicators, and as if they were only running on half a throttle and not full out all the It is safe to say that there is not another aeroplane engine in the world which could have gone through such a strain and test

"These three engines kept the machine in the air with the weight of 26,000 pounds running practically for the whole time of three hours and fifty-five minutes until the landing at Parrsboro at 5.50 A. M., being in the air ten minutes short of twelve hours.

"The race course which we sighted from the air and about which we knew nothing, appeared to be a proper place to land as well as a safe place, and had it not been for the concealed ditch, a new engine could have been installed and the

"In spite of the accident to the oil pipe

machine continue on its journey.

terminating the voyage, there are some excellent lessons to be learned from this trip, and much encouragement for the development of commercial flying.

"First-It proves the value of multiple engine machines.

"Second—It shows what a Rolls Royce engine and a thoroughly well built acroplane as the Handley Page can accomplish in the face of an accident, when thirteen tons are kept in the air for nearly four hours on three engines and might have kept up as long as there was gasoline to give the engines.

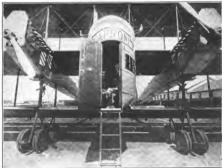
"Third—That wireless and directional wireless are of the greatest use in a machine large enough to carry them.

"Fourth—That comfort and sleep can be obtained in a Handley Page during a long flight.

"Fifth—In addition it is well to remember that in all the trans-Atlantic astempts, as well as this flight of twelve hours by a trans-Atlantic machine, not a single life has been lost or a bone broken. Given a good machine, good engines, good pilots, the risk in flying is very small. Settler is flying contined to any special Neither is flying contined to any special very and have been a pilot for five years and have been a pilot for five years and I will be 55 years old in September. One of the other pilots is close to 30 and the other under 25 years of age.

"I consider that there is a great future for commercial flying in America. The land of great distances, great trade and speed in and with which, if the aeroplane is used intelligently, will prove an enormous boom and an able assistance to commerce and travel over long distances and most especially in this, your wonderful control of the saft spromoters remember two things first its limitations and, second, reliability leforc all things."

Admiral Kerr is remaining in New York for a few days, after which he will return to Parrsboro to assist in repairing the machine, and he hopes to be able to fly it to Atlantic City in the very near future.



() Central News The car and landing gear of a Caproni passenger-carrying triplane



Rolls Royce Director Arrives in U. S.

New York.-Claude Johnson, managing director of Rolls-Royce, Ltd., arrived in the United States recently from London the United States recently from London for a conference with American repre-sentatives of the famous British motor corporation. He was not at liberty, he said, to discuss the company's American

Test Gasolene Substitute

Fifty automobiles climbed the steep Dock street hill in Yonkers after their tanks had been emptied of gasolene and filled with a substitute for it devised by Dr. Louis Clement. The demonstration was under the direction of the Society for the Advancement of American Inventors.

The principal ingredients of the substi-The principal ingredients of the substi-tute, which is known as "nuoline," are kerosene, naphtha and water. It can be made in 20 minutes and some of it was manufactured yesterday just before the test started.

Aaron A. Feinberg, former State Senator and Dr. Clement's attorney, said it could be produced for 9½ cents a gallon and retailed for 18 cents. He declared and retailed for 18 cents. He declared that a gallon would drive a heavy ma-chine eleven and a half miles, that it was non-explosive and would not carbonize. Several aeroplane manufacturers were present when the tests were made.

Goodrich Co, Enlarging Factory

Akron, Ohio.—A new building which will be the largest of the 84 in use by the will be the largest of the 84 in use by the B. F. Goodrich Co., will soon be under construction. It will be 170 x 300 feet, eight stories high. The warehouse will be built next to railroad siding and will have an unloading platform and seven special elevators.

Brolt Aircraft 275 Watt Dynamo Weighs 19 Pounds

In order to fill Admiralty requirements for extra light-weight dynamo sets for a special branch of the Air Services necessitating the full output for long periods or indefinitely if necessary, a new type of self-regulating dynamo accordingly was designed by Mr. Holt, technical director of Brolt, Ltd., of Birmingham, England. This design incorporates a scheme of forced ventilation whereby cold air was continuously blown through the interior of the machine, enabling an output of 275 watts to be obtained continuously at quite a moderatee speed, from a dynamo weighing under 19 pounds. For airship equipment, elec-trical apparatus has been designed and manufactured which has elicited eulogies from the authorities concerned,

Personal Pars

David Linton Ingalls, of Cleveland, O., has been re-elected captain of the Yale Hockey team next year. He was the only American ace in the U. S. Naval Aviation Service.

Tail Structure of NC Flying Boats Supported by Hollow Spars

Lieutenant Commander W. Starling Lieutenant Commander W. Starting Burgess, being a thorough yachtsman and well acquainted with the great ad-vantages of the hollow spar, conceived the idea that in the preliminary design of the NCs, the proper way to hold the tail structure would be by a hollow wooden

The Pigeon Hollow Spar Company is the original builder of hollow and laminated wing beams, struts, etc., and first to advocate to the United States Government the great advantages and practi-cability of hollow and laminated parts.

Lieutenant Commander Burgess' was followed by a conference at Washington, and later by an order for hollowtail booms for experimental purposes.

These booms were made and were sent to the Bureau of Standards and tested. The Pigeon Hollow Spar Company had several talks with Lieutenant Commander Burgess as to the strength reascertained that they must carry a loading strain of approximately 3,500 pounds. strain of approximately 3,500 pounds. There were two sizes of booms made, approximately 18 long, 6½" in the center, tapering to 2½" on the ends, and 5½ tapering to 2½" on the ends. These spars were constructed in four pieces, glued together with Pigeon glue. The tests were made at the Bureau of Standards, and a report was issued, which is as

boats, wireless messages could be transassistance of hollow telescopic masts which could be raised to a height of 33', this difficulty was overcome. These telescopic this difficulty was overcome. These tele-scopic masts were made in four sections scopic masts were made in four sections which telescoped from one to the other, so that the mast had a height when housed of only 12 pounds. The first sets were manufactured by the Pigeon Hollow

Spar Company. Both hollow spar and laminated structure have been acknowledged to be the proper methods in building aircraft. This method works to a great advantage by a great saving in weight, and at the same time it adds strength to the structure. By this construction stock is utilized in different lengths which would otherwise

be wasted.

The Pigeon Hollow Spar Company has been building flying machines and flying machine parts since the year 1910. On the first monoplane which they constructed in 1910 every strut, longeron, wing beam, etc., was hollow.

The advantages of the hollow spar are acknowledged likewise for all sailing and steam yachts. An experimental set of hollow spars for one of the latest destroyers brought about a saving in weight over the old solid construction of 60 per cent. Practically all the yachts, both English and American, which race for the America's cup, have been equipped with the Pigeon hollow spars.

Column Tests of Pigeon Hollow Sos

						Ultimate	Slope
Approx.		eter "	Weight	Prop.	limit lb.	strength	of comp.
Length	Middle	Ends	16.	Comp.	Deff.	lb.	curve in 1b.
(1) 17'9"	6.25	3.15	25.0	9,000	5.600	15,900	11.050,000
(2) 17' 9"	6.27	3.25	24.75	9,300	7,100	17.600	10.840.000
(3) 17' 8"	5.35	2.67	18.5	5.000	2,500	9,030	8.060,000
(4) 17' 8"	5.37	2.72	19.0	5,600	2,800 .	10.300	8,410,000
Tns. Lab. No	o. 0213b18						4

CHARACTER OF FAILURE

(1) Failed by buckling down at 1/3 point. Column split into five parts at point of failure.

(1) Failed by buckling down at 1/3 point. Column split into five parts at point of failure.

(2) Failed by benoing.

(3) Failed by benoing.

(4) Failed by benoing.

(5) Failed by benoing.

(6) Failed by benoing.

Much attention was attracted by the remarkable crushing strain withstood by these tail booms and by the manner in which they split. Not one of the breaks came in the glue joints. After very successful tests an order

After very successful tests an order was placed through the Curtiss Company for four sets of tail booms for the NC-1, NC-3, NC-3 and NC-4. When the booms were received by the Curtiss Company they were found to be so light for their length that there was much speculation as to their being strong enough for the work required. Another test was made at Washington, and it was found made at Washington, and it was found that they stood up to better advantage than the sample set previously submitted, and in no instance did they break where it was thought they would. This was accounted for by the fact that the sample booms had diaphragms every two feet, and the latter booms did not

The hollow spar was made of practical use of again in connection with the flying boats of the Navy Department. the original wireless equipment on these

Personal Pars

A. E. Aurand, formerly designing en-gineer for the Zenith Carbureter Corp., has been appointed chief engineer of the Claudel Carbureter Co.

Guy W. Yaugham, formerly in charge of production for the Wright-Martin Aircraft Corp., New Brunswick, N. J., has been appointed vice-president and general manager of the Van Blerck Motor Co., Monroe, Mich.

George N. Duffy has resigned as general superintendent of the Canadian Aeroplanes, Ltd., Toronto, to accept a position with the Canadian Cartridge Co., Ham-ilton, Ont., Can.

Edward A. Sipp, who has been serving as aeronautical mechanical engineer in the production engineering department, Bureau of Aircraft Production, Wash-ington, has left the Government service and is now connected with the Dayton Fan & Motor Co., Dayton, Ohio.



Aerial Mail Postage Reduced to Two

By an order of the Postmaster General today fixing the rate of postage on mail carried by aeroplanes at 2 cents an ounce, which is the regular postage rate for firstclass matter, the Air Mail Service was placed on the same footing with all other means of transportation of the mail.

The experiments during the year which have been devoted to the adaptation of the aeroplane to the needs of the regular daily mail service, have demonstrated postarious of the properties of the propert of the properties of the properties of the properties of the pr

In the same way mail from New York that did not eatch the 5:15 p. m. train for the West is now being delivered in Chicago in the afternoon instead of the following morning.

Arrangements are now being made to place on the New York-Washington route the three fastest aeroplanes in the Air Mail Service, each having a capacity of 18,000 letters and a maximum speed in calm weather of 132 miles an hour.

The department in anouncing this important change in the Air Mail Service makes the following statement:

"The sucessful operation of the Air Mail for more than one year and the great development for commercial work in the aeroplane in that period, has taken this phase of mail transportation entirely the properties of the properties

"The success of the airship in carrying the mail, together with the great development that has taken place in speed, in quantity of mail that can be carried and certainty of operation, makes it improbable that the air transportation of mail.



G. L. Conner, Chief Clerk of the Aerial Mail Service, is in charge of administrative work

whether by the Government or commercial air transportation lines will ever be stopped, but will increase from year to year ly keaps and bounds, especially over long distances. The great expedition of mail by this means of transportation constitutes a service which the public throughout the country is now demanding, and in course of time will receive, as supplementing the train service.

"For these reasons the air mail has been placed on the same basis with all other means of transportation and the rate of postage made the same as over all other means of mail transit."

G. L. Conner Has Long Postal Administration Experience

Mr. G. L. Conster, chief clerk of the Aerial Mail Service, has had long experience in postal administration. Mr. Connett has been connected successively with the railway mail, motor vehicle and aerial mail branches of the Postal Service. Prior to this he served three of America's leading railway companies over a ten-year period in connection with the transportation service.

Britain Planning to Send Mails By Air

An aerial mail service to foreign countries is being seriously considered by

Great Britain, the Assistant Postmaster announced in the House of Commons July 18.

It might not be long, he said, before mails would be carried to Australia, China and elsewhere in a comparatively few hours, revolutionizing mail transportation.

Colombia Plans Aerial Mails

Colombia plans to institute an aerial mail service over three routes—one between Bogota, the capital, and Barranquilla; the second between Bogota and Pasto and the third between Bogota and

Dr. Carlos Adolfo Urueta, the Colombian Minister in the United States, has been advised that bids for carrying the mails will be opened November 20.

Fiat BR Biplane Used in Speed and Altitude Record Flights

The improved Fiat BR biplane with a horizontal speed of 163 miles an hour, was used in establishing the world's three-passenger altitude record of 23,786 feet in 24 minutes.

The pilot of the Fiat BR in both its speed and altitude records was Mr. Brack-Papa, one of the most experienced of Italian aviators. It is the intention of Mr. Brack-Papa to fly the Atlantic on a special fast machine built on the same general lines as the Fiat BR. This machine will have a speed of more than 150

This IR. Fiat machine was designed just lefore the cluse of the war to be used as a high-speed long-range bomber. It is entipped with a 700 hp. 12-cylinder Fiat engine, which is the highest powered conjunction of the conju

AMERICAN COMMERCIAL, TOURIST AND PLEASURE AEROPLANES

AEROPLANE manufacturers in America are turning out aeroplanes especially designed for various commercial uses to which they are to be applied. From the small single-scater sport plane, these recently designed machines range in size up to the 20 passenger-carrying tourist aerobus. They are all of American design and except in two instances, where Le Rhone and Anzani engines are used, the machines

are provided with American engines at user, the machines are provided with American engines.

Among the ten machines illustrated on the opposite page there are four single-seater sport hiplanes, one two-seater flying boat, and a three-seater flying boat, one tandem twoscater, one side-hy-side two-seater, one three-seater with two passengers side-hy-side, and the 26 passenger tourist biplane. This means that out of ten designs there are but four of similar type. The characteristics sought for in designing these machines have made it necessary for designers to strike off on original lines and it is not to be wondered at that designs so radical have been put forth to meet these needs of civilian aviation

The commercial uses of these aeroplanes which are now being developed and in many cases already in use, include the following: aerial mapping and photography, express and mail delivery, passenger carrying, aerial touring, fire and police patrol, advertising, exploring, reconnaissance, news distribu-

tion, and exhibitions.

A brief outline of each of the machines shown in the accompanying illustration will serve as a means of comparison:

Aircraft Engineering Corporation "Ace

The "Ace" is a single-seater sport plane which has put up some very good performances at Central Park, L. I. The machine readily answers the controls and is especially suited for sport flying, light express or mail delivery, advertising and exhibitions.

The most noticeable features of its design are the I shape interplane struts and the central skid of the undercarriage, interplane strints and not central said of the inhiercarriage. The strutis made it easy to line the machine inp for there are no incidence cables to adjust. A great deal of hard usage has proven the value of the central skid. In taxying on the ground this skid prevents nosing over, climmating the ever present danger of damage from overturning. In landing, the heel of the skid acts as a brake bringing the machine to rest after a very short run on the cround. This feature makes the machine to the skid of th

ne suitable for small fields.

The upper plane has a span of 28'-4" and the lower plane a span of 22'-10". Chord of both planes 5'; gap hetween planes 5'-6'. Machine is 10' long and 7'-6' high. With a pilot weighing 135 pounds, the machine complete weighs about 650 pounds. In a test flight a sand load of 185 pounds searcied. The "Ace" climbs to 6,000 feet in 20 minutes, and to 8,000 feet in 27 minutes

A vertical four-cylinder, water-cooler, "Ace" engine is used. This engine delivers 40 H.P. at less than 2,000 R.P.M. The high speed of the machine is about 60 M.P.H. and the landing speed 35 M.P.H.

The Packard Two-seater

In the Packard aeroplane the pilot and passenger sit in tandem. The machine was especially designed for cross country trips but it is of a type suitable for delivery of excountry trips but it is of a type suitable for delivery of ex-press and news, reconnaissance, fire patrol, and as an auxiliary for police protection. The machine weighs 1,520 pounds empty and the complete flying weight is 2,167 pounds. The weight per horsepower is 13.5 pounds, and the wing loading 5.6 per square foot,

At ground level the speed is 102 M.P.H., the range for fuel At ground level the speed is 102 M.P.F.I., the rating for fuel at this altitude being 2% hours. At 5,000 feet the speed is 100 M.P.H.; this altitude is reached in 7½ minutes and the machine can stay aloft for three hours. The machine has an absolute ceiling of 19,500 feet. A Packard 8-cylinder, 160 H.P. engine is used. Weight complete, 855 pounds.

The Curtiss "Seagull" Flying Boat

The Curtiss "Seagull," formerly known as the "M-F," is suitable for the sportsman and for passenger-carrying at lake and seaside resorts. As an exhibition attraction the flying boat always plays a spectacular role. The passengers are seated side-by-side with dual control. The cockpit is finely upholstered and comfortably arranged.

Span of upper plane, 49'-9"; span of lower plane, 28'-10"; overall height, 11'-9".

overain height, H-9-. Weight empty, L790 pounds; useful load 636 pounds. The speed range is from 45 to 69 M.P.H., and an altitude of 5,000 feet is reached in 27 minutes. The maximum endurance is 325 miles. A Curtiss OXX 100 H.P. engine is used.

The Loughead Sport Plane

Low cost for operation is one of the features of the Loughead Sport Plane. At full speed the fucl consumed by the Loughead 24 H.P. engine is one gallon an hour, which, at a speed of 50 M.P.H. means 50 miles to the gallon; an expense

specio 150 M.I.C.I. meants 30 miles to line gationt; an expense of about 1 cent a mile. The Loughcad is a single-seater and weighs but 500 pounds fully loaded. Of this weight 200 pounds represents the useful load which can be carried. The upper wing has a span of 28 feet; lower wing 24 feet; overall length 19 feet. Fully loaded the high speed is 68 M.I.H., but the landing speed is only 28 miles an hour. The absolute celling is 10,000 feet. The hight range is 450 miles. Control is maintained in an unusual manner, there being no ailerons for the lateral movements of the machine; instead of allerons, the lower wing sections are arranged to pivot about their axes, accomplishing the desired manœuver.

The machine should find a good place in exhibition work, or advertising, as well as in the sporting purpose for which it

was primarily designed.

The Dayton-Wright "Messenger"

Veneer is used to a great extent in the bracing of the fusclage in the Dayton-Wright "Messenger" biplane. It is tuschage in the Dayton-Wright Meessenger update. It is probably the smallest commercial arcopiane flows in this 3-4". Overall length 17-6" and height 6-1". Unloaded, the machine weights 470 pounds; loaded it weights 630 pounds. The horizontal maximum speed is 85 M.P.H. and the landing speed is 37 M.P.H. In 10 minutes machine will climb to make the machine will be maked the machine will be machine will be ma an altitude of 10,000 fcet.

an annued of Jonov (ecc. An air-cooled De Palua, 37 H.P. engine is used. This is a four-cylinder, "V" type, weight 3.7 pounds per horsepower. Four gallons of gasoline are consumed per hour and the ma-chine has a tank capacity of 12 gallens.

Curtiss "Oriole" Three-seate

The three seater Curtiss "Oriole" has been made, its de-The three-seater Curiss "Ciriole" has been made, its designers claim, "for the man of affairs and for his family," Every comfort is provided for the two passengers who sit side-by-side in the forward cockpit which is reached by means of a door in the side of the machine. There are no controls in the forward cockpit and every consideration is given to the convenience and safety of the occupants. The machine travels at 86 MPI. It is span is 56 feet, which

is smaller than the average two-seater training plane. Fully loaded the machine weights 2,188 pounds. The engine is a 90 H.P. Curtiss OX. The "Oriole" answers admirably the requirements of peace time flying combining comfort and safety,

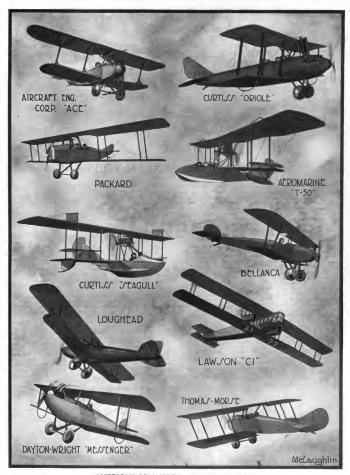
quirements of peace time flying combining comfort and safety, with economy, and beauty.

Span of both planes 36; length overall, 25; height overall, 25; height overall, 25; height overall, 25; height overall, 26; height overal

which time a distance of 393 miles can be traveled.

Aeromarine "T-50" Flying Boat

The Aeromatine Model T-50 Flying Boat is known as the "limonsine of the air." It is a three-scater boat with an open "limonsine of the air. It is a unit connected cabin for the two compartment for the pilot and an enclosed cabin for the two passengers seated side-by-side behind the pilot. The covering of the cabin is with celluloid; the frame is hinged at the middle, so it may be opened from either side. Steps are pro-(Continued on page 943)



AMERICAN COMMERCE AND SPORT PLANES



THE BRISTOL PASSENGER TRIPLANE

R OR commercial purposes, whether for the carriage of passengers or of freight, a special body has been de-signed and constructed for the "Bristol" signed and constructed for the "Bristol" Triplane. The passenger car described as the Pullman, is wholly enclosed, whilst the seats are placed on either side of a central gangway. There is ample head room as the Pullman is some seven feet in height, and for each passenger ladge Triplex glass windows are provided. There are also elaborate arrangements for electric lighting and heating. The seats are so arranged as to be easily removable and the space thus rendered available can be utispace thus rendered available can be utilized for the stowage of luggage and general cargo. The storage room thus available for cargo is 320 cubic feet.

The performances of this model in re-

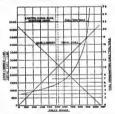
spect of speed, climb, range and weight spect of speed, climb, range and weight carried are approximately the same as for the Bomber riplane. Bearing in mind that the useful weight carried is in in-verse ratio to the quantity of fuel carverse ratio to the quantity of fuel carried and the consequent range of flight, it will be seen that, in addition to the two pilots, the machine is capable of lifting a load of 2,700 lbs. together with fuel for a five hours' flight, or, alternatively 4,000 lbs. with fuel for 7½ hours' flight. These figures are based on an ecoflight. These figures are based on an eco-nomical speed of from 100 to 105 miles per hour, that ia to say at three-quarters throttle, leaving a sufficient reserve of power in hand to reach 125 miles per hour if necessary. necessary.

In the accompanying graph, "load car-

ried" is in addition to the weight of two pilots, oil and water, but includes gaso-lene. For oil consumption, divide gaso-

lene consumption by 15. The main specifications of the Pullman type triplane are as follows:

Wing Area	(sq. ft.)													1,5	90
	Top P	ŀ	ı	14	e.									81'	-8
Wing Span	Center	ì	P	1	a	n	c		i	i	i	i		81'	8
	Bottom		1	P	1:	a	n	e						78	3
Chord of	Ving				÷									- 8	-0
Overall Let	igth													52"	-0
Maximum	Height													20'	0



LIND & CONTRACTION CLAVES FOR A LINCOLD. CO. Graph of performances of the Bristol Triplane Cargo Machine

When, for the conveyance of mails or other cargo, any or all of the passengers seats are removed, the following examples give an idea of the manner in which the accommodations may be arranged. These figures may be varied to suit requirements:

14 passengers and 280 lbs. of cargo 9 passengers and 1,180 lbs. of cargo 4 passengers and 2,080 lbs. of cargo 0 passengers and 2,800 lbs. of cargo

The above figures are based upon suf-The above figures are based upon sur-ficient fuel being carried for a flight of 500 miles, but if the full quantity of fuel is not taken, the weight of cargo may be increased accordingly.

For commercial purposes it is not desirable that the machine should be flown at its full speed of 120 miles per hour, and a speed of 100 miles per hour (a) three-quarter throttle) is recommended as being the most suitable in view of the

as being the most suitable in view of the coronny of fuel effected. Four 410 hp. Library engines are fi-ted, and any two of these are sufficient to maintain the triplane in flight in case of flying instruments is also fitted, com-prising: 2 are speed indicators, 4 rev-tution indicators, 1 switchbox for efec-tric lighting, 1 watch, 1 compass, 4 oil pressure, augues, 4 radiator thermom-eters, 4 Liberty switches and volutions lighting set for each instrument. lighting set for each instrument.

Personal Pars

Bruce Eytinge, sales-pilot, has had added to his duties those of advertising manager of the Aircraft Engineering Corporation, manufacturers of the "Ace" biplane.

Speaking of records, Captain Roy N. Francis, of the Army Air Service, now on duty in the office of the D. M. A., is believed to hold the record for number of hours in the air. Up to the present time this officer has more than 5,000 such hours to his credit.

Two new appointments have been made in the Information Group of the Department of Military Aeronautics. Major E, le. Jones has been assigned to the Dis-semination Division and Major Melvin Hall to the Collection Division. Both these officers served with distinction overseas, Major Hall especially, since he has been on duty with the French, the British and the American forces and seen action from 1914 till the armistice, all along the line from Ypres to the Argonne.

Book Review THE THUNDER BIRD, by B. M. Bower. gets its title. Price \$1.65, post paid.

The further aeronautic adventures of Skyrider" Johnny Jewell. When "Skyrider" Johnny Jewell won his aeroplant and the love of Mary V. Selmer, he may have thought his troubles at an end. As a matter of fact that had really only just begun, for that cherished plane was to lure him into so many exciting adventures that between them and the demands of Mary V., poor Johnny found his life just one succession of mishaps. Read this interesting story and see where this book

SOME NOTES ON ENGINE RUNNING

Skill in engine running is mainly a matter of experience, but a very great deal depends upon simple deduction and logical reasoning.

Every engine trouble is the result of one or more definite causes and as a rule is accompanied by symptoms from which the cause may be deduced. In any case a clue is obtained the cause may be deduced. In any case a clue is obtained from the manner in which the engine fails. For example, a sudden stoppage, unaccompanied by the obvious symptoms of internal breakage or "sering up," can only be due to com-servation of the companies of the companies of the com-a case it would be against the dictates of common sense to open up the engine, or even to inspect the spark plugs. In any case a clue is obtained

In the hands of a capable mechanic an engine in good con-tion should start with certainty and ease. When the engine dition should start with certainty and ease. When the engine is running, symptoms should be detected, and recognized, before any trouble fully develops, and in case of failure resulting from the more common causes, the fault should be located immediately, or at the most, after a brief inspection of the engine.

Starting Up

Before starting an engine, turn if over once or twice, once that the valves are not sticking, and that the compression is normal. See that there is a sufficient supply of gasoline and oil for the run, and that the oil is of the right quality and consistency. In winter it may be necessary to warm up the oil, or, in the case of castor oil, to thin it down with methylated spirit, which may be added in a proportion not exceeding half a pint to the gallon. In water cooled engines see that the water circulating system is in order, and contains the proper quantity of water. It is usual to allow about 2% for expan-

quantity of water. It is usual to allow about 2% for expan-sion of water when hot. When an engine has been standing, its cylinders will be filled with air or inert gas, and, in order to start up, this must be replaced by an explosive charge. In stationary engines this it has so done by turning the engine, with air imtakes closed, and gasoline on, when a rich mixture will be drawn into the cylinders, and the inert gas expelled. In roary engines this cylinders, and the inert gas expelled. In rotary engines this method alone is not practicable, owing to the large volunte of the crank case through which the mixture passes on its way before sarring, to "dope" or "prime" the cylinders by injecting gasoline through the exhaust valves. Some stationary engines also are fitted with a priming pump, which sprays gasoline into the induction pipes, and so facilitates starting up. Existing engines are started up by one or the other of the following methods:

(1) Propeller swinging (rotary and low-powered station-

- ary engines) Hand-driven starting magneto (2)
- (3)
- Mechanical hand starting gear A combination of (2) and (3)
- Compressed air.

Propeller Swinging

The usual procedure is as follows: The mechanic before approaching the propeller, calls out "Switch off, Gas on. Air closed."

The pilot turns the switch knob downwards, turns on the gasoline, adjusts the throttle, closed the extra air intakes, and repeats the words of the mechanic,

The mechanic, then gripping the propeller by each blade in turn, pulls the engine over, in its normal running direction, until the cylinders are charged. He then stands clear and calls out "contact."

The pilot turns the switch knob upwards and calls out "contact.

The mechanic then grips the propeller blade and making sure that he has a sound footing, pulls the engine sharply over compression and stands clear.

Hand Driven Starting Magneta

The procedure is as above but after the word "contact" the mechanic remains standing clear while the pilot starts the engine by vigorously cranking the starting magneto. (The starting magneto should not be left "om" when the engine is running)

Mechanical Hand Starting Gear

The cylinders are charged by turning the engine with the hand gear. While the engine is being turned over as fast as possible by this means, the switch is put "on" and the starting handle is thrown out of gear.

Mechanical Hand Starting Gear with Starting Magneto

In this case the starting magneto is usually geared to the starting handle and is switched "on" when the cylinders have been charged as above.

Air under high pressure is supplied to a small starring motor or directly to each of the engine cylinders in turn through a distributing valve driven by the camshaft. The air cock is opened and the engine is driven by compressed air until the cylinders are charged when the switch is put "on" and the cock closed.

Failure to Start

This may be due to: (1) Initial impulse lacking in vigor. (2) Incorrect adjustment of throttle. (3) Incorrect mixture. (4) Engine out of order. To start an engine it must be swung over compression at a reasonable speed. swing over compression at a reasonable speed. A mechanic exhausted by unsuccessful attempts to start a stubborn engine will be unable to put sufficient energy into the swing and should make way for a "fresh" man or take a short rest while looking over the engine to make sure that everything is in order.

Most engines will start best with a particular adjustment of the throttle which should be carefully noted. Where the carbureter has a slow running adjustment it is usual to start with the throttle quite closed. In other cases the throttle is

with net throttle quite closed. In other cases the throttle is set parily open, usually about one-quarter to one-third but never fully open. An explosive mixture contains approximately 18 volumes of air to one of gasoline vapor and if the gasoline vapor is present in a much greater or lesser proportion the mixture will be too strong or too weak and will explode with greatly reduced force or will not explode at all. The vaporization of the produced force or will not explode at all. The vaporization of the produced force or will not explode at all. The vaporization of the produced force or will not explode at all. The vaporization of the produced force or will not explode at all. The vaporization of the produced force or will not explode at all. The vaporization of the produced force or will not explode at all. The vaporization of the produced force or will not explose at all. The vaporization of the produced force or the produced to the produced force or the produced force or the produced the produced force or the produced force the prod gasoline is assisted by heat and when starting a cold engine (particularly in winter) the spirit will be only partially vaporized. This results in a weak mixture nuless a considervaporized. able excess of gasoline is provided for by flooding the car-bureters or "doping" the cylinders or induction pipes. In warm weather and especially when starting with the engine hot it is easy to get too strong a mixture into the cylinders. When an engine fails to start for this reason, it should be turned over in the anti-normal direction through two or more revolutions in order that the mixture may be weakened by the addition of air drawn in through the exhaust valves.

In looking over an engine that fails to start ascertain that the ignition system is in working order and that the plugs are clean, sound and correctly coupled to the distributor. See that there is no loss of compression through leaky valves, plugs, etc., and look for possible air leaks in the induction pipe joints. As a final measure the timing should be checked.

Symptom	Fault	Possible Causes, Remedies and Remarks
Misofiring, Regular	Plug or Connec- tion faulty	Cracked insulation. Points sooted up, too far apart, burnt away or fused together. H.T. con- nection broken or short cir- cuting. (To locate fault run engine for a few minutes and find coolest cylinder. If in doubt change all plugs.) (See below.)
	Loss of compres- sion in one cyl- inder	
Minsfiring, Irregular	Exhaust valve	Dirty or damaged valve stem or guide. (Clean stem or as a temporary measure moisten with paratin or gasoline. Valve rocker stiff on pin. (Clean and lubricate or renew if necessary.)
	Carburation faulty	Mixture much too strong or weak. (If t or 2 cylinders only may be due to air leaks in induction pipe.)
	Magneto contact breaker sticking, making bad con- tack, or out of adjustment	(Clean contacts, case moving parts and adjust.)
	Distributor faulty	Segments short circuited or par- tially insulated from brush. (Clean with gaseline.)

WOOD PROPELLER CONSTRUCTION

By PORTER E. STONE, M. E.

M UCH has been written about the design and theory of air screws made of wood, but very little has appeared about the construction and methods used to obtain the best results. Probably the one thing which designers and engineers forget, is that it takes time to make and thoroughly season a propeller during construction. When in production, it should require at least eight weeks as a minimum, from the time the lumber leaves

the dry kiln until the club is ready to ship. A great many people have the idea that propellers are a hard and difficult thing to make. After having handled about seven thousand, the writer considers it an easy manufacturing proposition. The prineasy manufacturing proposition. The prin-cipal thing to remember is to take plenty of time and he sure of every step. Speci-fications as furnished by the Bureau of Aircraft Production and Steam Engineering Department of the Navy, were not at all difficult to adhere to. The tolerances and balances were not exacting beyond the writer does not agree with all meth-ods recommended, if they are accurately followed, it will be possible to produce good propellers in quantity.

The first fifty or so propellers which are manufactured of any design, ought to be watched with great care, as all designs and types have their own peculiar track, etc.

The object of this article is twofold, first to help the designer understand a few of the problems the builder has to confront; second, to give new ideas to propeller manufacturers. So let us fol-low the lumber for the club from the time it enters the yard until the propeller is shipped

Propellers can be made from any timber which has a uniform texture and a high tensile and sheering strength. In the high tensile and sheering strength. In the United States, poplar, quarter-sawed white oak, birch, cherry, walnut and true ma-hogany from Florida, Central and South America, are included in this class. Poplar was found to be highly efficient on the

Mexican Border, on account of the exatexican horizer, on account of the ex-tremely dry climatic conditions. Quarter-sawed white oak makes a propeller which weighs the most, birch coming next, then walnut, cherry and maliogany. The streaks in cherry have been found not to be a serious defect. The great difficulty found in using mahogany is that there are small wind breaks which are very hard to see in the rough lumber. Spanish cedar and baywood are oftentimes mixed with mahogany, prohably a small amount in a pro-peller would not injure its quality, pro-vided the wood is of good texture.

Considerable discussion has been caused this last year by the fact that lumber mills have not taken enough care in sawing and have not taken enough care in sawing and cutting the log. That is to say, the man on the saw carriage was not careful to place the heart of the log parallel with the saw. This oftentimes resulted in a diagonal cut and, of course, made the lamination appear to have a diagonal grain, which was really true of the board itself. In quarter-sawed white oak, con-siderable bastard sawed lumber has been

Grading Lumber

When the lumber comes from the mill to the propeller manufacturer, consider-able care should be taken in grading the quality of lumber. Care should also be gether, and so marked that the kiln man can easily designate each car load lot. The mill man should be careful not to mix difmini man should be careful not to mix dif-ferent season's cuttings, as old lumber should not be mixed with green timber. The yard man of the propeller manufac-turer, when he finds these conditions ex-istent, should bring them to the attention of the kiln man.

At this time the propeller designer should become familiar with the percent-ages of widths of the stock, as small deviations in lamination layout will save much ations in lamination layout will save much lumber in the inamifacture. That is to say, laminations sometimes work out so that they are wider at the ends than the hult. As it is impractical to glue onto a lamination at the ends, this may necessitate a large percentage of wide stock, in

fact, one or two inches larger than the lamination at the hub. A small change in the design of the propeller, or the layout of the lamination would have caused a decided saving to the manufacturer, as wide widths are harder to secure than the narrower stock.

Lumber of half inch to one inch thickness gives the best results. the writer has found four-four rough stock to be the best, taken as a standard, dressed on both sides, and resulting in a thirteen-sixteenth thickness lamination. With this measurement as a standard, the designer could produce a lamination lay-out and make the propeller with that in

Yard Piling

A great many yards are not piled in a scientific manner. There is not enough timber used, together with a heavy enough foundation to keep the piles from settling at one corner or at one end. This results in giving the boards, after a duration of sometime, a permanent set. Also, in some vards it will be found that the long boards are allowed to overhang considerably, which does not benefit the strength of the lumber. A neatly trimmed pile, with a firm foundation gives the best results. A great many yard tracks are not laid straight, or level, so that when the kiln trucks are piled in the yard, there is a twist in the truck; thus, when the kiln truck is placed in the kiln, which generaltruck is placed in the killi, which general-ly has a track in very good condition, the boards are steamed and dried with a cer-tain amount of twist. In piling on the killi truck, after considerable experimentasion, the writer prefers twenty-four-inch spacing between cross sticks, and not in excess of thirty inches. The cross sticks themselves should be not less than one inch square, and care should be taken to place the sticks directly one above the other. Short boards should be blocked on the end, so that they will not get in wind from the steaming and drying process. If good care is taken in piling the trucks, it straight flat board is preferable to one which is sprung and in wind.

There are several methods of piling on the kiln trucks, such as chimney, stag-gered, and straight, any one of which are adapted to any type of kiln. However, each type of kiln will give better results with one than the other.

There are three principal things to re-member in all dry kilns. First, that hot air is lighter than cold air; second, that moist air is heavier than dry air; and third, the greatest quantity of air which can be moved equally throughout the kiln. can be moved equally throughout the kill. Together with these, there must be a good humidity control, and last, an automatic temperature-regulating device. In start-ing a kiln, for the first time, it is best to take punk sticks to test the circulation throughout the kiln, seeing that approxiinroughout the kim, seeing that approximately the same amount of draft is in equal heights of the kiln, as it is often found there are dead spots in the kiln, which naturally results in poor local drying. For propeller stock, any type of kiln will usually give fair results. While the time taken by the ordinary box kiln with natural circulation is slightly greater than the re-circulating types, if handled with a



Glued up propellers in block form

fair degree of care, and plenty of time taken, it will dry the lumber. The re-circulating type kilns, such as the Tieman and Tan types, give the best results in the able to allow the lumber to cool off in the kiln before removing it. That is to say, shutting off the beat in the kiln, and allow the thin before removing it. That is to say, shutting off the beat in the kiln, and allow the composition of the beat in the kiln, and allow the composition of the beat in the kiln, and allow the composition of the lower of so, not having the temperature of the lumber higher than 10°. It it is higher, and there is much dampness in the air outside, while cool-in cooling the control of the cooling the cool

Testing and Samples of Lumbe

It has been found advisable to have one sample test for every three thousand feet of lumber in the kiln. In testing lumber, it is best to cut off at least two feet from the end to eliminate end drying in the



A unit spiril lavel protractor for use with level bench without a pitch card

yard pile. Next, cut off about two feet, or a board that will weight more than five or a board that will weight more than hee pounds and not greater than ten. From this board, take off two one-inch disks, and weigh the disks immediately upon sawing. It is advisable not to saw with a circular or trim saw, but use a band saw where possible, as the heat of the smaller high-speed saws tend to dry the disks; thus they will lose a small amount of moisture. After cutting off the disks, coat both ends of the two-foot test board and weigh as soon as possible. Any good tar or asphaltic base, such as roofing ce-ment, can be used for coating the ends of the boards. The sample boards should be distributed throughout the kiln, not in exposed portions, as there will naturally be a difference of about two per cent in moisture content of the test boards and the lumber as a whole. That is to say, the test boards and sample boards taken from stock after kiln drying will weigh less by one to two per cent than the stock tests. Roughly speaking, a good kiln should dry quarter-sawed oak from fiber saturation, from five to seven per cent moisture content, at the rate of three-quarters to one per cent a day. Other woods can be figured at from one to one and a half per cent a day. Of course, the lumber can be pushed at a higher rate, if desired, but it is unwise to do so.



A practical type of balance stand used at the American Propeller factories



A Paragon torsion pitch three-blads propailer on a halonce stand



four-bladed propeller awaiting one of the

The disks, after weighing, should be put in an oven, with a temperature of approximately 180° to 20° F, and allowed to remain for twenty-four hours. It is not advisable to cut the disks in small mich square disk, the width of the board usually gives a very close result. After the disks have dired for twenty-four hours, re-weigh them, place them back in the disks have dired for twenty-four hours, re-weigh them, place them back in six hours again. Then weigh them again, and if they have not lost in weight, or are very nearly constant, take that fagure and subtract it from the weight green. Then will give the percentage of moisture in the disks. From this it is easy to calculate what the over-horied weight of the two-foot test boards should be. Having given the percentage of moisture in the disks. From this it is easy to calculate what the over-horied weight of the two-foot test boards should be. Having given the percentage of moisture in the them of the two-foot test boards should be. Having given the contraction of the two-foot test boards should be that the contraction of the two-foot test boards should be that the proper that the contraction of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot test boards should be the test of the two-foot te



Universal pratractor for use with lavel bench using pitch cards

boards at least every two days and figure the percentage of moisture in the test boards at that time. From experience, it has been found desirable to mark the weight and percentage of moisture directly on the test boards,

Shop Conditions for Lumber

It is advisable after cooling off the lumer in the dry kint to ple immediately on cross sticks in the shop proper, so that it will attain shop conditions in regard to himidity and temperature, as soon as possible. The lumber must not be soon as possible. The should be placed where there is good free circulation, and where there is good free circulation, and where there is good free little should be placed where there is good free first late and where the proper is the same amount of humidity as in the shop proper. If the lumber is to be useful once, it can go directly from the dry kiln to the manufacturing of the propeller, in which case ing after the lamination is cut out and dressed.

Laminetions

After having carefully made the correct lamination layout, and adding correctly the amount of extra stock needed in the manufacturing, then mark out the lamination. In mahogany and quarter-sawed as it is a good plan to join one side of the lamination first, then plane or dress the



Templet for accertaining the accuracy of the pitch of the propeller

other side before marking out the lamination.

In rough lumber it is quite hard to see the minor defects. After sawing out the lamination, then drill a one-inch hole for

the center of the hub.

Great care should be taken in laying and marking out the lamination, as a caretil man at this point will save much time later on in the manufacture and onnecestil some time in the side shorts for the hub wideners, to be used with the same lamination, cut from the same boards of the same learning maintain in the same large and density, when the same large will be same learner and density wideners when it is required. It is well to check the serrated joints by reversing

to check the serrated joints by reversing the hub widener, to see if the serrations match up in both positions. Then glue on the hub widener, allowing the lamination to stay in clamps for at least three hours. Re-band saw the lamination, then dress to size, checking the planer knives for parallel every time they are ground.

Tooth plane and then pile the laminations for equalizing. If the lumber has been dried to a variation not greater than three per cent, it is safe to asy that ten for equalization. If the stock shows slight case hardening, it is not objectionable, especially in quarter-sawed oak. It is advisable in piling, to use a one by one cross visable in piling, to use a one by one cross ten days, remove several laminations and test carefully for moisture content. Density tests can best be made by weighing the stage of the stage of the stage of the weights into three groups. A B and C. Although the writer believes an expert grader will obtain better results by grading to texture than in grouping for density ure are closely allied, the texture is generally more of a factor in determination of strength of a propeller than specific gravity or density of the wood.

After the laminations have faces sorted by groups or grades into three piles, then assemble, placing them on a balancing stand or balancing pin. While this is only a rough ladance, exceptional results can then the control of the co

Gluing

Now that the propeller is assembled, separate the laminations, carefully marking one end of each lamination (are reassembly. Place them in the hot box, which should be about 130 to 140° F, and merely heated by steam pipes, not introducing any extra moisture than is ordinarily in the glue room proper. Allow the laminations to stay from 10 to 20 minutes, the control of the control

It has been found that the cowl's which extend the entire length of the laminations are preferable to the small blocks which are sometimes employed. Cowl boxes are very good where enough pressure can be applied. There has been considerable difficulty in obtaining pressures as great as fity pounds to the square inch at the hub. Presumably, a few manufacturers have had some trouble with glued

joints at the hub.

When gluing quarter-sawed oak, it is expedient to have the lumber dried from five to seven per cent., and great care hould be taken in the steaming process in the dry kiln, as all tannic acid which



can be removed is best for the glue. When oak contains a high percentage of moisture, and considerable tannic acid, the glue will gradually deteriorate, especially if it is slightly alkaline.

The propeller should not be removed from the retainer or clamp in less than twenty-four hours. While the glue set in a much shorter time, it has not thoroughly dried and reached a high tensile strength. When the retainers have been removed, glue on any scabs or veneers which are necessary, then drill the large hub hole to within about one-quarter of an inch of full size.

Plane the pitch surface of the hub, then center for the first cut on the carving machine. Care should be taken to obtain a true center line passing through the center of the hub hole. After the first cut, hang the propellers horizontally for two weeks on a rack in the shon.

Carving Machine Methods

In the earlier methods of propeller manufacture, most propellers were cut out by hand, and today, in orders of less than



Machine for drilling flange bolt hole manufac tured by the Mattison Machine Works

ten, it would not pay to make up patterns and templets necessary for a carving machine. There are several small robary hand cutters which can be used to some advantage. The carving machine can be advantage. The carving machine can be propeller, or where the propeller moves nove in relation to the propeller, or where the propeller moves in relation to the knives. Carving machines generally cut with the grain, distinguishing them from the turning lathes, which cut cross the grain, either one surface that the completely around the propeller centing completely around the propeller.

Machine Work On Clubs

When the propeller has been thoroughly seasoned in the drying-out process, it is necessary to very carefully re-center for the second machine cuts. If this is not done, it is very easy to undercut one side of the propeller, not giving enough stock to finish within the limits. The second cut from the ordinary carving machines of turring lather can be almost to size.

Probably the best practice is to drill the hub hole to size and oil, then the filters for the hub flange on both sides of the propeller. While the filter is only necessary on pitch side, from continual handling, the advantage of the filter on the camber side will be seen. The old method of drilling the flange both holes from either side of the propeller has been superseded by the new type of machine,



Propeller shaping machine manufactured by the Mattison Machine Works

which will cut the flange bolt holes completely through from one side.

The next operation is exceedingly important, that is the shaper operation. Place the propeller on the shaper pattern, using the second machine cut center holes, and a spindle to fit the large hub hole, placing the propeller pitch side down, the pitch side having been accurately dressed before. It is not necessary to leave more than one-eighth of an inch over size in its carefully made, it staves comiderable trouble in getting face alignment and in obtaining a vertical balance.

Bench or Hand Work

There are several methods used for working the propeller out by hand or finishing the propeller. The first one is to have a bench which is level in all direchances are several to the propeller rests parallel with the bench using an ordinary wooden protractor with templets to fit the oval or round parts of the propeller. The edge alignment is taken to the propeller. The edge alignment is taken ordinary buck with a spirit level proordinary buck with a spirit level pro-



A rotary hand cutter in operation

trigger hole is used, it is determined from the jig, and if there is a slight mistake in boring the flange bolt holes or trigger hole, the jig will show before any hand labor is done on the propeller. By a few pitch side, as from an engineering standpoint, the most effective work is done by the camber side. After the propeller has been lalanced, it is then time for the first standard to to tolerances, etc. All propellers change pitch and shape during the first fortyeight hours, after coming off the bench. Each design has its own particular charleach design has its own particular charleach design has its own particular charcut from experience only. When these characteristics are known, they can easily be corrected by the workman on the bench. After checking the propeller at the end of fill as soon as possible. The kind of fill fill as soon as possible. The kind of fill gid depends on the kind of wood used.

Tipping Propellers

There are several methods of putting metallic tips on propellers. Copper and brass are most commonly used, although in a few cases aluminum has been used. After considerable experimenting, the best method seemed to be the use of both screws and critical sections of the considerable experimenting, the best properties of the considerable experimenting, the best properties of the critical section of the considerable experimental sections and critical sections of the considerable experimental sections and considerable exper



Special jigs used with the Mattison Propeller Hub Boring machine to space holes for attachment to Liberty meter

tractor and metal or wood templets for each station. Some difficulty arises with the buck method of manufacture, as it is rather hard to define the center line, especially when it is nearer one edge than ready of the control of the control of the control of the control of the discrepancy is not very great near the tay, in has caused a difference of a quarter of an inch in width of the propeller at the discrepancy is not very great near the tay, in his caused as difference of a quarter of an inch in width of the propeller at the control of t

details not shown, it is possible to have tolerance readings taken directly from the jig.

in balancing the propellers in the white, it is advisable to balance or scrape on the



Unfinished propellers hanging in seasoning room of the American Propeller Co. of Baltimore

thicker than one-half inch, and the screws in the thicker parts of the blade. It is a good plan to countersink the wood with a drill for the screw and rivet heads. On some propellers it is not advisable to recess the full width of the blade, because the double recessing thins the blade. In soldering the screw and rivet heads, care should be taken not to use too much acid, as the acid has been known to cause detriresults to the wood and glue. mental Probably the best method to be used in tipping a propeller is to recess the pitch side only and router on the camber side of the blade. If proper care is taken when putting in the rivets, no splits will occur. Care should also be taken with the soldering not to get too much heat, as there have been cases where the metallic tip became so warm that it scorched the wood underneath.

Metal tips should not be used except where there is a water spray or where th propeller is liable to get too near the ground. The leather tips are far preferable for ordinary aeroplane use. Leather can be put on in either of two ways: First, with the hair side of the hide next to the blade, or the flesh side next to the blade. There are good reasons for either way. Pigskin has been shown to produce the best leather tips. These tips want to be inspected quite carefully for defects. It is best to mark out the tips and weigh them, then scive the edges. It is a good plan to put the lap on the camber side on some propellers, and on others it is best to have the lap on the pitch side. pends entirely upon the shape of the blade. The leather tips should be thoroughly The leather tips should be thoroughly sized, also the wood propeller. When they are dry, coat the propeller and tip with fresh coating of glue, using a warm iron to smooth out the wrinkles and fulness in the leather, unless a very slow setting rebalance the propeller, as some leather tips absorb a great deal more glue than others. When the tips have thoroughly dried, shellac them.

Linen tips are very desirable for high speed propellers, as the linen binds the propellers together, and keeps the atmosphere from getting at the glued joints. The linen should be brought up on the propeller as far as possible with the width the goods, using one selvage edge to go around the propeller at the point nearest the hub, as any tendency to ravel will be eliminated by using this selvage edge. The linen should be thoroughly washed and shrunk before using, as the average linen shrinks from one to two inches in the width of 36-inch goods. While it is not entirely necessary to glue-size the wood propeller before applying the linen, it is advisable. Care should be taken in putting on the glue-size, either for the leather or linen tips, as it will often put the propeller out of pitch. It is best, in most cases, to glue-size the camber side first, let it dry, then glue-size the pitch side. This will often save the propeller from going out of pitch. Before proceed-ing any further with the propeller, it should be carefully balanced and inspected, since it is impossible to balance the propeller at a later stage.

Painting Propellers

Linen and leather tips should be shellaced, flange both lotes and hub holes, etc., should be carefully oiled and filled, and transfers placed on the propeller. When they have dried for about forty-eight hours, then give them a coat of varnish. It is has been found advisable to use the same spar varnish throughout, thining the first coat with turpentine from fifteen to

twenty-five per cent. This thin varnish penetrates the pores of the wood. Next, apply the four coats of finishing varnish, harring off between each coat. The time required for drying between each coat is determined by each maker of spar varnish. When dull finish propellers are desired, use a brash with pumice and water. The varnish drying rooms should be kept at a moderate temperature and a fairly high

In hanging propellers in the varnish room it is much better to hang the propellers in a vertical position, since it is much easier to correct for sagging varnish in the horizontal balance than it is to have a sag on one side of the propeller, which causes a bad vertical balance and is difficult to correct. If the propellers are hung in a vertical position, care should be taken to reverse the top and bottom between

each cost.

After the propeller has been carefully checked for balance and inspected for pitch and track, it is ready to place in the crate. If the propeller is not to be used immediately, a wax or parafin substance should be put in the flange bolt holes, also

coating the inside of the hub hote. The box for craing the propeller should be made of thoroughly dried lumer, as green humber is neither good for the varnish, nor the propeller itself. The type of box depends entirely upon where the propeller is to be shipped, and the length of time it will remain in the box. A propeller must not be expected to last of the property of the propeller must not be expected to last of the property of the propert

Conditions in General

Propellers, correctly speaking, should be made for certain climatic conditions where they are to be used. Since this is not possible, it is better to dry all lumber to about seven per cent. as it will be seen from reabsorption curves of lumber, it does not create as many internal stresses as lumber which is naturally dried out by evaporation. Thus, clubs which contain a smaller amount of moisture are much better than those which contain a high nercentage of moisture, when they are to be shipped to various climates. Although there are places in the world where lumber containing twenty per cent. moisture can be used with complete satisfaction, other places require only five per cent, moisture, and even then, will cause trouble on account of the extreme dryness and

heat.

After having tested a great many comAfter propellers which ad been around
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cent. In the pamphlet published by the Signal Corps, U. S. Army, Inspection Department, entitled: "Information for Inspectors of Airplane Wood," and prepared at the Forest Products Laboratory, Forest Service, dated 1918, page 43, there is a composite curve showing the moisture content of woods by different humidities and coom temporature more and coom temporatures.

cent

During the process of manufacture, propellers should be kept in a horizontal or flat position on a shelf, or on the floor, as the variation in room temperature and humidity, from top to bottom, causes the

Propellers to change unequally.

The shop should be kept at as near an even temperature as is feasible, although variations from night to day of from tea to fifteen degrees will not materially burt the propeller. The main thing in the shop is to watch the humidity not to get too great a variation, or, in other words, keep the humidity as nearly constant as pos-

Balancing Stands

There are two types of balancing stands in use, one using the knife edges about eight inches long, the other using the roll type bearing. Eather was give and give results, although the knife edges will give results, although the knife edges will give less cause for dispute in balancing. The second of an inch wide, of hardened steel and about eight inches long, parallel and level in both directions, and checked by diagonal leveling. The stops at either end should be tested very carefully with a square to see if they are at right angles to the knife blade edges. If they are not, when the propeller is rolled on the edges, the horizontal axis of the balancing mandrel will not be at right angles to the knife edges. Probably the best type of balancing mandrel is the two-piece tapered or cone type. The rolling part of the mandrel on the knife edges should not exceed one inch in diameter. Considerable discussion has taken place as to the balancing stand. It has been discovered that if both knife edges receive the same vibration at the same time, the propeller will balance irrespective of the vibration of the knife blades, such as vibrations im-

parted by machines, etc., in the building. The most satisfactory propeller to build is one which has a low pitch angle, for it is more certain to stay in pitch and track. High-pitched propellers are hard to keep in pitch and track because too much end grain is exposed, allowing the propeller to dry out unequally which results in a continual twisting action in the propeller Three and four-blade propellers should be built in the detached blade method. That is to say, each blade being built separately and dove-tailed together by dowels and keys. However, four-blade propellers can be built as two separate at the center. Since the speed of and four-blade propellers is never excessive, the detached method is preferable, not only from the manufacturers' point of view, and shipping, but also from the aviator's standpoint, as it is possible to re-place one blade if it is damaged, in place of discarding three or four.

.....

In summariting the methods used and the care to be taken in manufacturing propellers, there are a few points which cought to be emphasized. These are namely: careful grading of the lumber, kind drying (the United States Government having shown the woodworking industries the correct processes), sorting and gradtic correct processes), sorting and gradgibing, basper operations, workmanning and final balance. If these essentials are followed carefully, the manufacture of good propellers will result.

The foregoing suggestions are adaptable to the manufacture of propellers in quantities. Small orders should be treated merely as experimental work.



NAVAL and MILITADY AEDONAUTICS ^



Army Plans Flight Around Country's

The most extended flight yet planned by The most extended light yet planned by the Air Service of the U. S. Army, in the interest of recruiting, charting of routes, and the locating of landing fields, is con-templated by Lient. Col. R. S. Hartz, J. M. A., A. S. A., commanding officer at Bolling Field, Washington, D. C.

Colonel Hartz will take with him as Colonel Hartz will take with film as a reserve pilots Lient. Ernsest E. Harmon, R. M. A., A. S. A., Lieut. Lotha A. Smith, R. M. A., A. S. A.; also as a mechanic, Sgt. John Harding, Jr. The aeroplane used will be a U. S. Martin Bomber. The flight as planned will total 7,805.

miles as follows:

miles as follows:

Washington, D. C., to Miami, Fla....1,120 miles
Miami, Fla., to San Antonio, Tex....1,140 miles
San Antonio, Tex., to San Diego, Cal., 1,129 miles
San Diego, Cal., to Scattle, Wash...1,170 miles
San Diego, Cal., to Scattle, Wash...1,170 miles
Scattle, Wash, to Duluth, Minn...1,275 miles
Duluth, Minn... to Augusta, Maine...1,445 miles
Augusta, Maine, to Washington, D. C. 353 miles

The flight will not be direct between cities, but will vary according to considerations and demands to be determined by Colonel Hartz

Summary of Flight-Miles (estimated), 7,805; States in which flights are to be made, 31; cities passed over or near, 95. Passed over or near the following: National lumber reservations, 29; govern-ment projects, 7; water sheds and drainage slopes, 9: mountain ranges and mountains, 36; oceans, gulfs, bays, seas and lakes, 48; railroads, 27; rivers, 88; transcontinental routes, 13; miscellaneous, 6.

The Air Service Photographic Recruiting Expedition

Forty-six cities and towns in six states, Delaware, Maryland, New Jersey, Penn-sylvania, Virginia and West Virginia, will sylvania, Virginia and vest Virginia, win be visited by the photographic recrniting expedition which will leave Langley Field, Va., on or about July 22, 1919.

The expedition will travel in five Cur-

tiss H acroplanes, accompanied by a motor truck and lorry. The truck and lorry will be a complete photographic developing and printing establishment containing all the latest apparatus for the production of the latest apparatus for the production of finished work and a place where recruits may obtain their first insight into the work performed upon the film and plate after it is taken from the camera.

Distribution of Victory Medals Delayed

The War Department authorizes the following statement:

The distribution of Victory Medals is delayed. In view of the large number of applications now being received, attention is called to the fact that Victory Medals will not be ready for issue for several months. The method of distribution has not been determined, but it will probably follow the general scheme now being used for the distribution of the Victory Button. Wide publicity will be given to adopted scheme when medals are ready for issue. Applications for medals should not be made until that time.

Resources of Air Service in Equipment and Personnel Officially Reported

The War Department authorizes publication of the following information on the service plane resources of the Air Service

On March 1. 1916, the total resources in planes of the Aviation Section, Signal Corps, was 13 aeroplanes, 4 hydroplanes,

Corps, was 15 aeropianes, a nyaropianes, and I flying boat.

On March 19, 1916, the first aero squadron went into Mexico with eight Curtiss JN-3 planes, a type now inferior to the primary training plane. After being in there Iwo months, four more planes were shipped to them.

At the present time there are on hand n the United States 1,240 battles planes in serviceable condition; enough to make approximately 50 squadrons. Besides these there are in storage 862 battle planes that could be put into commission almost immediately.

The advanced training plane, of the type now used for forest patrol, could if necessary be used as an observation plane. Of these there are 653 in commission at the fields, and 150 in storage. A total of 52 squadrons of training planes could be assembled.

The resources of the Air Service in planes are as follows:

Туре	Designed to see the se	in storage with medora	Fotal	Vumber of squadrens couffile
DH-4	Observation			
Spad Le Pere	Day bombing.1,191 Pursuit 27 Service 18	842	2,033 27 18	8135

Handley.	Bomber	4	20	24	t
S. F., 3	training	46	57	103	4
JN6-H	Advanced	653	156	809	32
S4-C	Advanced	400		400	16
7-4			7.076	7.00	116

There are in the United States to-day 1,394 flying officers. This number includes

1,394 hying officers. This number includes flying officers on staff duty, etc. Information on the number of planes available in the Southern Department is given herewith. This, however, is not an accurate indication of strength immediately available, due to the fact that while there are sufficient planes and pilots for the planes, there is not sufficient enlisted personnel to take care of them without transfer from other branches of the ser-vice or recall of men furloughed to the reserve.

There are on duty now about 73 men with a squadron of ten planes and two or three other squadrons are being organized at various points in the Southern Department.

Following is a table of planes available, by types and fields, in the Southern De-partment, showing a total of 788 classed as active planes and 878 obsolescent. The 88 would be available for immediate use, and 878 could be used in addition if necessarv.

Special Orders Nos. 150 to 155, Inclusive

The appointments on May 12, 1919, of the fol-owing named Air Service officers, United States

The appointments on May 12, 1919, of the following anised Art Service (Reve, 10 aniel States To be found from the appointment of the Art Service Thomas To be found from the Art Service (Thomas To be found from the Art Service Thomas To be found from the Art Service Thomas To Grey, Marson Prancis Hart, Tomas Lotto, Johnson Tomas Hart, James Lotto, Johnson Tomas Tomas Tomas Tomas Tomas Tear Tomas Toma



Caproni passenger-carrying tripiane new being used on aerial routes in Italy, powered by three Rolls-Royce engines



FOREIGN NEWS



From an im-Handiscape in the London Aerial Devlay.

From an im-Handiscape in the London Aerial Devlay.

From an im-Handiscape in the Indiana of the Indiana of the Indiana of Indiana.

The times made for each lap by individual competitors were very compared to the Indiana. Indiana of In

Allied Air Service Committee Under Leagus of Nations Urged
13.—The practical co-operation between Great Britain
of the League of Nations is now vigorously advocated. The flight of
the L-14 arrhip to America and her return and the enthusuastic reception, accorded her on the other side by Americans again bring this mat-

tion accorded by on the caber side by American we has been the best trained personnel policy, in contraded, to invite America operation of the contraded of the property of the contraded of

Baroness De La Roche, Altitude Record Helder, Killed
Paria—Baroness De La Roche, the famous French avistria, who
holds the world's altitude record for women, was killed in an accident
at the Crotor Aerodrome. The Baroness received her pilots' license in
1910 and was the first woman to fiy over Paris.

At the Air Exhibition at Amsterdam the Vickers Rolls ecroplane in which Sir Labibition at Amsterdam the Vickers Rolls ecroplane in which Sir Labibition and Amsterdam to be on view. During the exhibition an acrial service, which is to be maintained afterwards, between Faris and Amsterdam, should do much to keep interest allive in the show.

Swiss Filer First Across Alps in a Hydroaeroplans in the Alps were crossed for the first time by a hydroaeroplane across of the Alps were crossed for the first time by a hydroaeroplane and the Alps with the Alps with the Alps with the Alps with the Alps were also across the Alps with the Alps wi

D'Annunzio Offered Direction of Civillan Aviation in Italy mome—The Italian Government has offered Gabriele D'Annunne the post of Director General of Civillan Aviation. D'Annunne beld a company of the Civillan Aviation. D'Annunne beld a war and engaged in many bombing expeditions, including the raid on Vienna.

Vienna. Abert Vicker, Arespane Constructor, Die Vickers was der Vicker, Arespane Constructor, Die Vickers, Langelaus Constructor, Die Vickers und Forster und Vickers, Lange one et allegander von der Vickers, Lange oder ein gester und Vickers, Lange oder ein gester der Vickers und der Vickers und der Vickers und der Vickers was active in sports, taking particular intérest in mostre return der Vickers was active in sports, taking particular intérest in mostre return und vickers was active in sports, taking particular intérest in mostre return vick was Miss Helter Gage of Boson. See la Vickers de Vick

Alteraft Equipment of French Naval Aviation Service From a statement issued by the French authorities one notes that on October 1, 1918, the French Navy possessed 870 avious or hydravious, 59 airships, and 196 observation ballooms, divided up as follows:

	Aviona or		
Sector	Hydravions.	Dirig.	Balloon
Dunkirk-Cherbourg	 . 168	21	22
Brittany	 . 104	11	39
Loire-Bidassoa	 . 74	7	21
Mediterranean (French coast)	 . 110	4	41
Corsica	 . 38	2	0
Portugal	 . 16	0	0
Algeria Tunis	 176	11	31
Morocco-Senegal	 . 44	0	0
Corfu	 . 54	3	1.2
Egean See		0	3.2

List. Certina Haide Altitude Record for South America West. Dev. Man. Program of the 1st Aviation Consumy of the Chilena Army had succeptibly this remarkable highly he dad see easilyhed a height record for South America. For many years the height of \$250 metres recorded by the America. For many years the height of \$250 metres recorded by the America. For many years the height of \$250 metres recorded by the America. For many years the height of \$250 metres recorded by the America. For many years the height of \$250 metres. Lient. Parvold when the America of Parvold Program America at an altitude of \$550 metres.



Interior view of a Grahame-White passenger-corrying pla The comfortable glass-enclosed cabin shuts out the roar of the

(Continued from page 930)

vided on the outside of the hull for gaining access to the compartments.

This type of flying boat is purely a sport machine designed for pleasure flying. The complete enclosure of the passengers makes it unnecessary for them to don special clothing, as they are fully protected from wind and spray.

The upper plane has a span of 48"4"; lower plane has a span of 27"4"; chord 6'-3" stagger 12"; gap between planes 6'-6". Weight of machine empty, 2,000 pounds; weight fully loaded, about 2,500 pounds.

The Bellanca 35 H.P. Biplane

One of the smallest successful sport planes is the Bellance 35 H.P. Biplane which weights only 400 pounds. It is a twoseater but the forward cockpit can be covered over and machine made to appear like a single-seater. The machine can be used for carrying light express or mail for it has a useful load of 375 pounds.

The upper plane has a span of 26' and the lower plane has a span of 20'-6". Chord of upper plane 4' and of lower plane 2'-4"

Total wing area, 150 square feet. Length overall 17-7". The maximum speed light is 58 M.P.H. and the minimum speed is 34 M.P.H. It can climb at a rate of 820 feet per minute. An actual test was made of its gliding ability in which it was shown that from an altitude of 4,600 feet, a glide of 10 miles was made and the descent required a minutes and 5 seconds time. An air-cooled, 3-cylinder, Anzani "Y" type engine is used, weighing 325 pounds.

The Lawson "C-1" Aerial Transport

The Lawson Aerial Transport Type C-1 was designed to carry 26 passengers. It is the first of its kind to be built in America and is probably the forerunner of several designs of the same type which will find an important place in the future of commercial aeronautics. The fuselage is entirely enclosed so that the passengers can be considered to the control of the c

Both planes have a span of 85' and a chord of 9'-6"; gap between planes 9'-3"; overall length, 47'-7"; overall height 14. Fully loaded the machine weighs 12,000 pounds. In ten minutes it ascends to an altitude of 4,000 feet with a full load. The service ceiling is 15,000 feet and the gliding angle 1 to 8.

Two 12 cylinder 400 H.P. Liberty engines are completely enclosed in nacelles with radiators on their forward ends and propellers in pusher position. Propellers are 10 in diameter and revolve opposite one another. Every effort has been made to increase the safety factor on all parts of the machine, and the provision of ample control surfaces makes the machine sensitive to control.

Thomas-Morse "S-7" Two-seater

The side-by-side seating arrangement of the Thomas-Morse S-7 makes it an ideal machine for passenger carrying and for ordinary pleasure uses. The passengers' compartment is upholstered and finished in accordance with best aeronautical ord comfort and ease of maintenance has been given the problem of comfort and ease of maintenance are not of the control of the side-by-side type to employ an air not let outary reachine of the side-by-side type to employ an air not let outary reachine of the side-by-side type to employ an air not let outary reachine of the side-by-side type to employ an air not let out out of the side-by-side type to employ an air not the total with a side-by-side type to employ an air not the total to the width of the body heatuse at the cockpit the body is no wider than at the cowling surrounding the engine.

The Colving surrounting me engine.

Both wings have a span of sight 2 length overall, 21-6;
Both wings have a span of sight 2 square feet, and the load per square feet including allerons is 32 square feet, and the load per square feet of is 4.6 pounds. An 80 HLP, Le Rhone air cooled rotary engine is used. The fuel capacity is 20 gallons, which is sufficient for a 25 hours. The high speed is 90 kg and 10 kg and 10

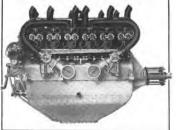
Built by Cir.
Trated by T. S. Govt.

LANCIA AVIATION MOTOR FOR SALE

This motor has been run only 10 hours in a test for the U. S. Government at McCook Field. The test showed it developed 320 h.p. at 1,380 r.p.m. and weighs 740 lbs. Surprisingly low gas consumption. It is unquestionably one of the most efficient 12 cylinder aviation type motors in the world. A number of spare parts is included with the motor, such as a complete set of extra cylinders, pistons, water pumps, etc. Can be inspected any time.

THOMAS E. ADAMS

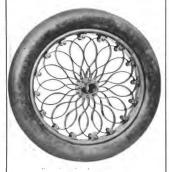
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AIRPLANE in hangar. Note room for camp beds at each sida under top plane. Front wall closes on cabla at top and lashes in center. Non-delachable pags at bottom make it wind and rain



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FIRE-AUTOMOBILE-TORNADO-EXPLOSION-RIOT AND CIVIL COMMOTION

(Continued from page 939)
W. Evitt, Dudley Miller Outcalt, George Lyon
Nicol, Walter B. Dudley, William V. Marshall,
Edgar A. Rogers and John Humphrey Small, Jr. Enjar A. Rogers and John Hummbers, Small III.
To be explained. Ari Service: Jesse A. Johnson,
Paul Karl Palaere, Clarence Roy Signal, Joseph
Faul Karl Palaere, Clarence Roy Signal, Joseph
Grant C. Palaere, Carlone Roy Signal, Joseph
Grant C. Palaere, Carlone Roy Signal, Joseph
Grant C. Palaere, Carlone Roy, Bart Alfred
J. DeVorr, John Francis Bigh, Burt Alfred
Lind William Anderes Gray, George H. Brran,
Rossell Bonner, Kirly, Jr., Henry T., Hale, Harold
G. William Anderes Gray, George H. Brran,
Rossell Bonner, Kirly, Jr., Henry T., Hale, Harold
J. William Lander, Gray, George
Berry, Michael H. Garant Randell, Charles
Berry, Michael H. Starte, Jr., Leyber S., SunSand, Vincent R. Butler, Jr., Leyber B. SimpSand, Vincent R. Butler, Jr., Leyber B. SimpSand, Vincent R. Butler, Jr., Leyber B. SimpSand, Carlone R. Oscorly, William Leant and John Janes
To be mainten, Art Servicei, Warre P. Mon-

Elliott.

To be majors, Air Service: Warren P. Munsell, Frederick W. Zinn, Fred W. Sizer, Arcemus
Carter, Andrew B. Hawkins, Robert George Bloedel, Henry Capron White, Voon Irwin Moncrief,
Thomas J. Leary, Harry O. Payne, Gustav Vordtriede, Vardra Magbee Hallman, Jr., Charles C.
Merz, William A. Dickema and John Gordon

To be lieutenant colonel, Air Service: Frederick Ostermann, John Hamilton Jouett and William Wynn,

To be colonel, Air Service: Olan C. Aleshire. The following-named officers will proceed to Plattaburg Barracks, N. Y., and report in person to the commanding officer, United States Army General Hospital No. 30, that place, for duty: Franklin E. Allen, Ralph D. McLaughlin and John Sunderland, Jr.

The following-named second lieutenants, Air Service (Actonauties), will proceed from Wash-ington, D. C., to Souther Field, Americus, Ga., and report in person to the commanding officer for duty: Samuel W. Dunford and Paul G. Peik. for cuty: Samuer w. Duntord and Paul G. Petk.

The following named second lieutenants, Air
Service (Aeronautics), will proceed from Carlstrom Field, Areadia, Flat, to Souther Field,
Americas, Ga., and report in person to the commanding officer for duty. Robert T. Cronau and
John A. Wyatt.

The following named officers will proceed to Washington, D. C., and report in person to the Director of Purchase, Storage and Traffic for

duty with the Director of Finance: Fred J. White and Bernard F. Bockenfeld. Capt. John A. Macready will proceed by aero-plane to Bolling Field, Anacostia, D. C., and upon completion of the duty enjoined, will return by rail to his proper station, Dayton, Ohio.

Maj, Dean Smith will proceed by aeroplane to Bolling Field, Anacostia, D. C., and upon the completion of this duty will return by rail to his proper station, Dayton, Ohio.

proper station, Dayton, Ohio.

Second Little, Herbert E. Metcall will proceed
to San Françisco, Cal., and report in person to
very for transportation to Fore Island, Pearl
Harbort, Honolidis, Hawaii, by the first available
in person to the commanding persent Hawaiin
Department for duty with the 6th Aero Squadron,
portation, Municion Building, Washington, D.
C., for accommodations for so much of the journey as requires water transportation.

The following-named officers, Air Service, will proceed to Fort Sam Houston, Tex., and report in person to the commanding general Southern Department for assignment to duty: Joseph H. McCalloch, Harold C. Block, Edgar A. Liebhouser, Philip Rotelle and Sidney L. Wheaton.

Christopher A. Reid will proceed to Mont-gomery, Ala, and report in person to the com-manding officer aviation repair depot for duty. Pirst Lieut. Homer Rogers will report in person to the Director of Purchase, Storage and Traffic, Washington, D. C., for duty with the engineering and standardization branch.

First Lieut, Frederic Hamilton Thorne will rocced to Mineola, Long Island, N. Y., and sill report by letter to the Director of Air erryice, Washington, D. C.

First Lieut, Henry W. Isbell will proceed to Ellington Field, Houston, Tex. Capt. Charles H. McDonald will report in person without delay to the Director of Air Ser-vice, War Department, Washington, D. C., or duty as legal adviser to and as a member of the Air Service Claims Board.

Second Licut. James Pratt Hodges will pro-ceed to Langley Field, Hampton, Va. First Vieut, James Henry Sullivan will pro-eeed to Washington, D. C., and report in person to the Director of Air Service, for duty, First Lieut. Ernest P. Haley will proceed to Fayetteville, N. C., and report in person to the commanding officer Pope Field, Camp Bragg, for duty.

Second Lieut. Matthew E. Finn will proceed Carlisle, Pa., to the commanding officer United tates Army General Hospital No. 31 for duty. States Army General Hospital No. 31 for duty. First Lieut, Hiram E. Wilson in assigned to duty with the Committee on Training Camp Ac-tivities, and will report in person to the com-manding officer March Field, Cal., for assign-ment to duty as athletic officer.

Leave of absence for 10 days is granted First Lieut. Carl E. Royer, Air Service (Aeronautics). LICHI. (AIT E. ROPET, AIT SETVICE (Aeronautics).
Second Licuit. Peccy H. Heron is transferred to Walter Reed General Hospital, Washington, D. C., and will report in person to the commanding officer that hospital for further observation and treatment.

Second Licut. Theodore J. Lindorff will pro-ceed to Washington, D. C., and report in per-son to the Director of Air Service for duty.

son to the Director of Air Service for unity.

Second Lieut. Thomas A. Stratton will proceed to Hazelhurst Field, Mincola, Long Island,
N. Y., and report to the commanding officer at
that camp for discharge.

that camp for discharge.

First Lieut, Harry C. Colburn is announced as heing on duty requiring him to participate regularly and frequently in aerial flights from December 2, 1917, to May 11, 1918.

Second Lieut, Henry G. Woodward will proceed to Bolling Field, Anacostis, D. C.

First Lieut. Charles C. Cook will proceed to Washington, D. C., and report in person to the Director of Air Service for duty. Second Lieus, John Henry Gardner will pro-cerd to Souther Field, Americus, Ga.

Second Lieut. Kenneth B. Wolfe will proceed Souther Field, Americus, Ga.

to Souther Field, Americus, cas.

Second Lieut. Arthur Anthony, Sego. Aviation
Section, Signal Gorps, is announced as on duty
requiring him to participate regularly and frequently in aerial flights from August 26, 1918,
to September 12, 1918.

to September 12, 1918.

Capt. Edward W. Rucker, Jr., will proceed to Boston, Mass., and report in person to the commanding general Northeastern Department for duty in the office of the department Ai Service officer.

Second Lieut. Harold R. Wells will proceed o Fort Omaba, Nebr., and report in person to he commanding officer Army Balloon School for

(Continued from page 933) Sudden fall-ure to fire (all cylin-ders) Complete failure of fuel supply Fuel pipe broken. Fuel tap Connection to distributor broken. Distributor brush broken. Lead from magneto to switch in contact with "earth." Complete failure of magneto. Complete failure Air leaks in induction pipes. Carbureter jet too small. Fail-ure of gasoline supply due to eboked jet. Gasoliue tap part-ly closed by vibration. I on sufficient pressure in petrol sank: Weak mixture Water in fuel sys-Condensation or water in gaso-line cans (gasoline should be filtered through chamois leath-Iulet valve stick-Dirty or damaged valve stem. See above. In stationary engines, this will result in contact be-tween bot exhaust gases and incoming mixture, Exhaust valve sticking Weak valve spring (Recew.) Incorrect timing Too much overlap, Weak mixture As above. Failure of lubrica-Leaks in oil system. Choked pipes or filters. Oil too hot. Insufficient oil. Oil pump failure. The Spark too far re-Leaks in water system. (Inspect all joints.) Pipiog, jackets or pump elogged with sediment and scale. Failure of water pump. (Impeller loose on spindle—brokeo impeller.) Failure of water R-34 Worn or damaged piston ringa-Worn or damaged obturator rings. Look for "blueing.") renew.) Leaky plugs. (Fit new washers or renew.) Gud-geon pin loose resulting in scored cylinder. Loss of compres-Sunbeam Motors and Pre-ignition Knacking Overheating (as above) causiog particles of earbon deposit, spark ping points, or exhaust valves to become hot enough to ignite the charge during com-pression. In the absence of actual incandescence, acute general overheating my re-sult in spontaneous gainto. Vickers - Vimy Rolls-Royce Motors Spark too far ad-In rotary engines, a new cylin-der incorrectly fitted or of in-correct weight. In stationary engines a new piston of in-correct weight. Bent crank-shaft. Engine out of bal-Vibration Both specially selected and obtained perfect lubrication on their historic Trans-Atlantic flights with Part of engine or engine fittings loose Engine mounting WAKEFIELD Propeller out of 'CASTROL'"R" Propeller or pro-peller boss loose Self ignition Overheating. (See pre-lanition.) C. C. WAKEFIELD & CO., Ltd., Wakefield House, Chaspaids, London, E.C.2 Defective switch, bad "earth" coonection or broken leads to switch, Broken switch eir-74 Cortland St. New York Overlubrication U. S. A. cylinders (blu-ish grey smoke) Mixture too strong (black smoke) Carbureter flooding due to punc-tured float, worn or damaged needle, or dirt on valve seat-

Some Notes On Engine Running

needle, or dirt on valve seating.

Jet too large. Air lotake gauze choked. Air pressure excessive owing to failure of relief valve. "FLY A 'BELLANCA' AND KEEP THE 'UP' OUT OF 'UPKEEP'"!

HIGHEST SAFETY FACTORS O-SEATER LOWEST UPKEEP COST

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Contractors to the United States Government

Washington.-The War Department made public recently a captured German document showing the importance the enemy attached to salvaging our aeroplane wireless apparatus of the "continu-ous or undamped wave type." The document is also looked upon as indicating that the Allies had progressed further than the Germans in the radio equipment. It reads in translation:

"XIII. (Wurtemburg) Army Corps, H. Q., Corps Headquarters, 5-6, 1918. Routine Order No. 30.

I. (1s) Captured aviation W. T. fittings.
"The enemy has found it possible to
use wireless installations for undamped
waves in his aeroplanes. So far few fittings of this type of apparatus have been captured by us, and in order to enable us to make use of this as soon as possible and also so as to save millions, which would have to be spent in experiments, it is everyone's duty to see that all W. T. fittings from captured aeroplanes are salved as completely as possible. Even the smallest pieces will be collected as a

the smallest pieces will be collected as a tyro cannot recognize the value and im-portance of small parts to the expert. "W. T. fittings which have been salved will be forwarded to the nearest aircraft unit, which is responsible that they are sent on immediately to the commander of aviation.
"In view of the importance of these

fittings for our own wireless telegraphy, sums paid for salvage will be high.

The surprising efficiency and success of Allied radio equipment caused strenuous efforts on the part of the Germans to capture samples of our equipment.

Washington, D. C.—According to a statement issued by the Director of the Air Service, the 74th Aero Squadron, organized at Langley Field, Va., to utilize 20 De Haviland aeroplanes in connection with the coast defense, will carry on aerial adjustment of artillery fire for the coast artillery batteries stationed at Fort Monroe, and will adjust on floating targets as far as 20 miles out. These planes have been turned over to the squadron and will be assembled by Air Service recruits.

The squadron will maintain regular practice surveillance patrols over this section of the coast, when operating with the artillery, a system of finding the target and destroying immediately by the rapid adjustment of artillery fire by wireless. The 74th Aero Squadron is commanded by Capt. Cleaton Reynolds, who commanded the 104th Aero Squadron in San

Mihiel and the Argonne offensive,

Operations will be directed by Capt, Frazier Hale, who was the operations officer for the Air Service of the Fifth Army Corps at San Mihiel and the Argonne. Liaison will be conducted by Capt. H. M.

Gallop, who also commanded an active service squadron in France As it is proposed to establish a brigade of Railway Artillery near Fort Mouroe,

this squadron will also operate with this extra heavy artillery.

Souther Field Secures Recruits By Clever Campaign

Souther Field, Va .- In order to create interest in the Air Service on the part of

Enemy Tried to Get American Radio Seventy-fourth Aero Squadron on Coast collisted men, Lieut. Floyd A. Wilson, Defense Duty personnel adjutant and publicity of force personnel adjutant and publicity officer, has issued an application to all enlisted men at the field, calling for the following information: Name in full, name of daily paper at his home town, and whether he desired a flight.

If a cross-country is planned to any such town, the enlisted man is taken as passenger to his home town, the local newspaper is wired and a reception prepared for the man's visit, thereby creating sufficient interest to cause a 32 per cent increase in the enlistments at Souther Field.

Foreign Service Roster

In completing the War Department foreign service roster, beginning with January 1, 1917, and for future computations, service in Alaska, China, Hawaii, Mexico (Punitive Expedition 1916 and 1917). Panama, Philippine Islands, service with Porto Rico Regiment of Infantry outside limits of United States, service overseas with all American Expeditionary Forces and service when attached to foreign armies in actual campaigns, will be counted as foreign service.

Foreign service will be counted from date of departure from continental limits of the United States of America to date of return, both dates included. It is di-rected that all officers of the Army be guided by the above, but that this is not to be construed as in any way modifying the foreign service roster in effect up to end. including December 31, 1916.

AUG 4 1919
PRINCETON N.J.

WEEKLY

Vol. 9, No. 2

AUGUST 4, 1919

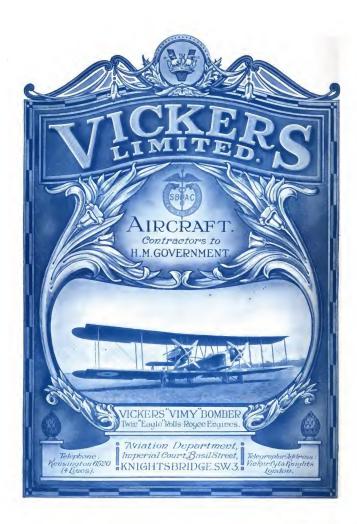
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The Heart of Detroit, As Seen From An Aeroptane

Curtiss Company Purchases Atlantic City Airport

Dig and by Golgle





THE ENGINES IN THE VICKERS-VIMY AIRPLANE WERE EQUIPPED WITH

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Vol. IX

AUGUST 4, 1919

No. 21

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VOL. IX

NEW YORK, AUGUST 4, 1919

NO. 21

CURTISS COMPANY PURCHASES ATLANTIC CITY AIRPORT

FINDING that the organization of the extensive pioneer aeroplane tours, and similar pioneer constructive activi-ties need his entire attention, Mr. Henry Woodhouse, the ties need his entire attention, Mr. Henry Woodhouse, the founder and owner of the Atlantic City Airport, has accepted the offer of the Curtiss Aeroplane and Motor Corporation and has sold the Airport to the Curtiss Company. As the Airport has achieved world prominence during the past four months since Mr. Woodhouse created and established it. At the time there was no civilian Bying and it was generally And it was feared that by next year public interest would die out and the aircraft industry would die of starvation. Mr. Woodhouse was almost alone in his belief that civilian aviation activities would begin as soon as a flying field was interested in firing to participite activity. He presented the interest would be infinite to activities and the contraction of th interested in flying to participate actively. He presented the idea to many people and organizations and was called visionary. Then he decided to prove the soundness of his plan at ary. Inen ne decided to prove the soundness of nis pian at his own expense. In two months he organized the Aeronautic Convention and Aerial Contests held at Atlantic City in May and established the Atlantic City Airport. He also organized the extensive series of important scientific and practical aerial tests and demonstrations conducted at the Airport during the past two months and started an entirely new epoch in aero-

So important were these demonstrations that thirty countries sent their representatives to witness them and the Airport has been the meeting place of international aeronautic experts ever since.

experts ever since. The Airport became the mecca of aviators, civilian and military. They arrive at the Airport daily from different parts of the country, put up overnight or stay a few days and participate in tests and demonstrations and then proceed on. The first arroplanes bought by civilians since the war, with two exceptions, were bought for the Atlantic City activities, for passenger carrying, intercollegiate contests and pleasure flying. Today these are not less than five hundred individual acroplane owners and the manufacturers cannot fill the orders. aeroplane owners and the manufacturers cannot fill the orders fast enough. It is estimated that two thousand planes could be sold this summer if the manufacturers could deliver them. The Curtiss Company has sold 132 one hundred H. F. biplanes of the type known as "Orioles," which made its initial flight from Mincola to Atlantic Gity on May first in a storm, for the opening-day celebrations of the Second Pan-American Aeronautic Convention and Exposition, and was the first plane to arrive at the Airport. It carried Mr. Victor Hugo Barranco, the representative of President Menocal of Cula, who brought a message from the latter to be read at the Con-

Many of the owners of these aeroplanes have signified their intention to participate in the aeroplane tours which are to start at the end of August or in September, and are to extend south as cold weather comes.

To begin with, the tours will be divided into four classes, as follows: (1) One-day tours for people who can only spend one day a week; (2) week-end tours, which will last from

Friday to Sunday or Monday, for people who can only spend their week-end; (3) "Vacation Week Tours," which will last one week for people who wish to spend a week of their vacation in aerial touring; (4) three thousand mile tours, which will last ten days, for the people who wish to spend two will last ten days, for the people who wish to spend two the tours will be to open airways for air travel, and establish supply stations throughout the country for air travellers. The average travel for one day in these aerial tours will be 250 miles, which is less than four hours in the air, so as to afford plenty of time each day for aerial tourists to "take in" other diversions, such as tennis, golf, swimming, motoring, the control of the diversions, such as tennis, golf, swimming, motoring, people of the control of the diversions, such as tennis, golf, swimming, motoring places, where necessary repairs will be made to take she had aeroplanes attended to at the lowest possible charges.

Every effort will be made to create a market for the surplus

Every effort will be made to create a market for the surplus Army and Navy aeroplanes, motors, accessories, and aeronautic materials. The Atlantic City Airport, the world's first Airport, is located in the heart of Atlantic City, where approximately 15,000,000 people come each year from every part of the world. It is the first municipal llying field in the world extended to the world. It is the first municipal llying field in the world extended to the world. At the control of the world are accepted to the world affording facilities for land and water aeroplanes practically in the facilities for land and water aeroplanes practically in the having five and ten kilometer courses marked with regulation high towers as required by the International Aeronautic Federation for testing the speed of aircraft and for aircraft contests. The Airport is located in the heart of the city and has Every effort will be made to create a market for the surplus The Airport is located in the heart of the city and has the riparian rights on the thoroughfare, which affords a fine the riparain rights on the thoroughtare, which alrords a his location for hangars for explanes. It covers the entire section of Antanic Classifies a honorm as Chelsea Heights, and age of 3400 feet on South Boolevard. The entrance to the aviation field is only 2000 feet from the Boardwalk and four minutes thy automobile from the Atlantic City, Railroad Station, with railroad siding within 300 feet of the Airport cutrance and crease for unloading acroplanes and motors. It entrance and cranes for unloading acrophanes and motors. It has a water main, and electric current and suitable police and fire protection. The value of the land of the Airport is set at over half a million dollars. The negotiations were conducted view of the control of the control of the Vice President and General Manager, and Mr. J. W. Forke, secretary of the Curtiss Company. It is understood that the Curtis Company have plans for extensive activities to be conducted at the Airport, and a statement regarding the plans conducted at the Airport, and a statement regarding the plans of the conducted at the Airport, and a statement regarding the plans and the conducted at the Airport, and a statement regarding the plans (Mr. Woodhouse is to have the use of the Airport for the Aeroplane Tours, Intercollegiate Contests, Aerial Shooting Contests, and scientific tests and practical aerial demonstrations. Mr. Mountain has stated that one hundred thousand dollars will be spent to improve the Airport and make it The World's Accombante Show Window.



THE NEWS OF THE WEEK



Curtiss Plane Breaks American Altitude

Mineola, L. I .- According to information from the Curtiss Engineering Company, the American altitude record was broken on July 25 by Roland Rohlfs, test bruken on July 25 by Roland Rohlts, test pilot for the corporation, who in one of the new Curtiss "Wasps" reached a height of 31,100 feet. The record has not yet been homologated by the Aero Club authorities. This is 2200 feet hetter than the record made last year by Major R. W. Schroeder, U. S. A., who in a British-built Bristol with a Hispano-Suiza motor satesinad an afritude of 28,900 feet. The attained an altitude of 28,900 feet. The French aviator Casale, in a Nieuport, is credited with an unofficial record of 33,-

100 feet The machine Rohlfs flew is a triplane designed and built as a pursuit machine for the United States army. It is equipped with the new 400-horsepower Curtiss motor and under government tests has at-

tained a speed of 160 miles an hour. Martin Bomber Starts on Flight Around Country

The Martin bomber, carrying a crew of five, commanded by Lieut. Col. R. S. Hartz, left the ground at Washington at 10 A. M., July 24, on the first leg of a flight of nearly 8,000 miles around the rim of the country.

The flight is the longest ever attempted by the Army Air Service, and will carry the machine through thirty-one States, over ninety-five cities, and cover long stretches of the Atlantic, Pacific, and Gulf Coasts, as well as the Canadian border.

Lieut. Col. Hartz was accompanied by ientenants Ernest E. Harmon and Lotha A. Smith as reserve pilots, and Sergeant John Harding, Jr., mechanic, and Jeremiah Tobias, master electrician. The big machine rose from Bolling Field, circled the White House in low flight then headed away on its course.

The general line to be followed will arry the machine in order to Duluth, Minn.; Seattle, Wash.; San Diego, Cal.; San Antonio, Texas; Miami, Fla., and back to Washington. The actual measured distance of the route is 7805 miles.

The time for the first lap of the journey from Washington to Mineola, a distance of 200 miles, was made in 145 minutes. Water and oil leak developed over Baltimore. Master Electrician Jeremiah To-bias walked out on the wing and fixed the same, photographs being taken of the work.

On July 25, the machine left Mineola at 8:25 A. M. and reached Augusta, Me., at 1:05 P. M., making a perfect landing

on the State muster grounds.

Lieut, Col. R. S. Hartz, on July 26, resumed his flight in a Martin bombing plane around the rim of the United States, after four hours' delay on account of engine trouble.

The plane rose at 11:15 A. M. on what was intended to be a flight of 660 miles to Cleveland, Ohio. After being lost in the air for nearly three hours the army bombing plane landed at Upper Jay, near Lake Placid, burying its nose in the ground. The crew were badly shaken up but none was seriously injured. Lieut. Col. R. S. Hartz stated that the machine would be forced to remain at Upper Jay for at least two weeks to make necessary repairs. In hitting the ground one wheel, damaged in landing at Augusta, broke, swinging the machine completely around.

Bowman Increases Toronto Flight Prize

John McE. Bowman announced that he John McL. Bowman announced that lie had increased the prize for the air race hetween New York and Toronto, and from Toronto to New York, from \$5,000 to \$10,000. Mr. Bowman offered the \$5,000 prize some time ago. The race is to be in the week of August 25, at the time of the Canadian National Exposition.

Fishing from Seaplanes Saves Time Atlantic City, N. J.—Earle L. Oving-tion, president of the Curtiss Flying Sta-tion at Atlantic City, and Mr. C. W. Forse, secretary of the Curtiss Aeroplane and Mater Co. of Buffale, started off reand Motor Co. of Buffalo, started off re-cently in a Curtiss "Seaguil" for the fish-ing banks, five miles off the coast her-In less than four minutes the folding anehor had been thrown overboard; in three minutes the first bite was reported; with-in eight minutes they had caught three four minutes later they were back at the hangar. By boat more than an hour would have been consumed in going to and from the banks. If you value time, use an aeroplane.

Aeromarine Passenger Carrier Makes Speedy Atlantic City Trip Vallantic City passenger carrying Varlantic City passenger carrying Varlantic City passenger carrying Varlantic City passenger carrying Varlantic City and City, carried two passenger carrying Varlantic City and return between 1 and 7 P. M. The trip down was made in 150 minutes and the return in 78 minutes. The distance of the Varlantic City and City of the Varlantic City and City of the Varlantic City and City of the Varlantic City of the Va

Those who had obtained booking for Those who had obtained booking for the first flight on the seaplane line were Mrs. John A. Hoagland, wife of a baking powder manufacturer, and her friend, Miss Ethel Hodges of Dallas, Tex. They were safely ensconeed in wicker seats in the eabin de luxe, which is upholstered in brocaded satin.

In the pilot's seat was Robert W. Hewitt, formerly with the United States Naval Air Forces. The fare is \$100 each way and each passenger is permitted to take thirty pounds of baggage. Baggage over that weight will be charged for at the rate of \$1 a pound.

The boat, equipped with a 150-horsepower motor, is twenty-six feet long and has a wing spread of fifty feet. C. Nicholas Reinhardt is manager of the new



All aboard for Atlantic City on the Aeromarine aerial limousine. Mrs. John A. Hosgiand and Miss Fithel Hodges were the first passengers in New York to the coast resort. They were safely piloted there and back by Robert W. Hewitt

Balloonists Meet at Worcester

Worcester.—The pilots interested in ballooning convened in Worcester re-cently and voted to make Worcester the central headquarters of the Eastern the central headquarters of the Eastern department of balloon avaistion. Among those present were J. Walter Flagg, expert balloon pilot, and vice-president of the balloon and the balloon balloon and the balloon balloon and the balloon balloon and the balloon bal Theodore E. Hedlund, ex-United States war service overseas aviator and presi-dent of the Massachusetts Aero Club of Service Aviators, and Ensign Lester P. Dodge, who saw service in the naval plane department.

The airmen voted to procure several balloons and it is hoped to begin flights September 1.

Commutes to Summer Home By Air Vineyard Haven, Mass. — Week-end commuting by aeroplane received an impetus on July 25 with the completion of a New York Development of the Part of the Par

Inspecting Balloon School Site at Camp Dix

Officers representing the Federal Balloon Commission are inspecting and mapping out the land in the vicinity of Lewistown, west of Camp Dix, N. J., which will be required for the proposed balloon school—the largest in the United States.

Aeroplane Helps Auto Racer to Victory

Detroit, Mich.—The Bearings Service Company of Detroit received an order



known trapshoster and aportavoman, is the first of her sex to purchase an aeropiane for purely pleasure nurness.

from Tommy Milton, driver of the win-ning Duesenberg car at the Uniontown Races just 24 hours before the race. The front wheel was broken in a trial the day before the race, and a thorough search of Uniontown and Pittshurgh failed to unearth a bearing of the proper size. Train connections being impossible, the Univerconnections being impossible, the Universal Aeroplane Company was called on and a flight of 300 miles was made in 210 minutes, the remainder of the distance being completed by automobile. Repairs were made in time, and Milton and his Duesenberg won the race.

Ten Planes Fly to Albany

Albany, N. Y.—In command of a squad-ron of ten aeroplanes, Col. Archie Miller, on July 25, flew from Mineola to the State capitol, in order to deliver reports and recommendations concerning aerial activities for the information of the Governor. The Curtiss H made the trip in 85 minutes and the De Haviland in 70 minutes

Mexico to Purchase Military Aeroplanes

Washington, D. C .-- Ambassador Bonillas, of Mexico, in conference at the State Department on July 17 with Acting Sec-retary of State Polk and Henry P. Fletcher, American Ambassador to Mexico, renewed his request for permission to purchase acroplanes and munitions in this country for his government. He said

arter the conterence he believed the re-quest would be granted.

Mr. Bonillas, who has just returned from a month's stay in Mexico City, re-ported on the progress being made to pacify Mexico.

First Woman Pleasure Flyer

Mrs. H. L. Potter, of Madison, Wis., has the distinction of being the first woman in the world to purchase an aeroplane for pleasure flying.

Ruth Law and Katherine Stinson have been flying for several seasons but they have taken up aviation as a commercial proposition

Mrs. Potter purchased a Curtiss JN-4D from George W. Browne, Curtiss dis-tributer for the Middle West, and she has been using it on shopping tours between Madison and Milwaukee and Chicago.

She is one of the best trap-shots in the country, attending all the tournaments in the West and she will use her plane as a means of transportation this summer. Lt. Robert Connelly, formerly of the U. S. air service, has been engaged as pilot and will teach Mrs. Potter how to



The twin-motored Loughead flying beat ready for service at Santa Barbara, California. It carries fuel for a 450 mile trip with ten passengers

Rockaway Plans Shaft to Mark NC-4 "Hop Off"

A meeting of the Rockaway Civic League took place at the Belle Harbor Yacht Club to form an organization to raise a fund to erect a monument to commemorate the flight of the NC-4 across

the Atlantic.

T. Burke McGuire was elected chairman and tentative plans were formed for a national appeal for funds. It is proposed to place a shaft at the spot where the NC-4 "took off" at Rockaway Point.

Many Entries in New York-Toronto

New York, N. Y.—A large number of aviators have signified their intention of entering the New York-Toronto context. On the American side are Col. H. E. Hartney, United States commander of the Third Parrati Group of fighting aero-term of the Parrati Group of fighting aero-term of the Parrati Group of Spring aero-term of the American States of

Among the Canadians who will enter the contest are Col. W. A. Bishop, V. C., D. S. O., and Col. Barker, V. C., both

famous Canadian aces, together with Capt. William Younghusband and F. G. William Younghusband and F. G. William Younghusband and F. G. William Walliam Captain and the control of the cont

Dirigible Accident in Chicago

Chicago, Ill.—Eleven persons were killed and twenty-seven injured when an exhibition dirigible from a Chicago amusement park caught fire over the business of the control of the Illinois Trust and Savings Bank Building. After flying over the city for several hours, flames were seen to burst out through the top of the blimp's heart out through the top of the blimp's make a compared to the control of the contro

the gasonie tanks were neared to explode.

Nine of the bank personnel were killed

The cause of the accident has not been

the cause of the accident has not been

the cause of the accident has purst

from the heat and sparks from the ex
haust caused the fire to start. The manu
facturers of the dirigible have agreed to

pay all damage resulting from the acci-

Wed by Radio Telephone Aboard Aeroplane

Matrimony in the air was a feature at Speedway Fark, Sheepshead Bay, on July 26, at the second Police Field Day, when Miss Milly K, Schaefer, daughter of Mrs. Katharine Schaefer, of Sea Gate, became the acroplane bride of Lieutenant George H. Burgess, U. S. Air Service, Glying at an altitude of 1,000 feet, with an assembly below of 200,000 spectators. The first

real sky pilot married the couple through the use of the radio telephone.

the use of the radio telephone.

The ceremony was conducted between two United States Army-Curtiss aero-planes equipped with 150 horsepower motors. The prospective bride and bride-groom flew in one machine, while the minister and best man occupied the second

plane. Ceremony was performed by the Rev. Alexander Wouter, pastor of the Eev. Alexander Wouter, pastor of the Park, Broddyn, Lieutenant Eugene H. Barkedale, U. S. Air Service, acted as best man, and Miss Doris K. Schob, of Broddyn, served as bridesmad. The bride-elect had never been up in an aero-

Oil Magnate Commutes from Denver to Tulsa in Oriole Plane

Hutfalo, N. Morel, I. Britmmphreys, president of the Humphreys, President of the Humphreys Petroleum Co, has purchased a Curtiss three-passenger Oriole biplane for use in traveling between his Denver home and his oil properties located near Tulsi, Okla. He is forced to make the trip several times some, requiring hitry-six hours. His new means of travel will enable him to leave his home in the morning and return the same evening. He will return to Buffalo in August to secure a second Oriole service over the mountains to Estes Park and Colorado Springs.

Two Ex-R.A.F. Officers Will Take Long Trip in Curtise "Seagull"

The longest flight undertaken by civilian flyers in a flying boat since 1914 will start from New York early next month, when S. E. Parker and G. Talhot Willcox, former Majors in the Royal Air Force, will set out for New Orleans by the inland water route. They may continue their flight around the Gulf of Mexico to

their flight around the Gulf of Mexico to Pannma and South America, in a Currisa "Scagull," equipped with wireless telephone and telegraph. Heading up the Hudson, they will stop at Peckskill, Newburgh, Poughkeepsic, Catskill and Albany. Thence they will sto Troy, Schenectady, Stilwater, Saratopa Springs, Gens Fallia, New Latter and State of the State of the State Stilwater, Saratopa Springs, Gens Fallia, Plattsburg and Alburg. Their schedule calls for arrival on the St. Lawrence in September. Moving west, they will stop at Syracuse and Oswego, Ontario Beach and Buffalo. From Buffalo the loast will will lied down the Ohio and Mississippi Rivers, arriving at New Orleans in time for the Mardi Gras.

for the Marth Gras.

Major Willcox flew in the Dardanelles campaign and Egypt during the war. Major Parker served in France in the 60th British Pursuit Squadron, to which Col. William Bishop, "ace of aces," was attached.

San Diego-San Francisco Flight at 135 Miles An Hour

San Francisco, Cal.—The remarkable time of 272½ minutes (appeed 13422 per hour) made by Lieut. J. W. Sharpmack, in a Liberty motored Le Pere, on July 24, for a distance of 610 miles on a non-stop trup from San Diego to San Francisco, carrying one passenger, has established a San Francisco. The motor, despite the strain of the flight, was in perfect mechanical condition upon its arrival.



Earls L. Ovington and C. W. Forse, who took a speedy fishing trip in a Curties "Seaguil"



The AIRCRAFT TRADE REVIEW



Air Line Between New York and Bridgeport Planned

Bridgeport, Conn.—Bridgeport is ready for the establishment of an air freight and passenger line, as announced in New York by the National Air Service Cor-York by the National Air Service Cor-poration, which plans to operate an aerial transportation system between New York and Boston with stops in this city and New London. Several months ago the Chamber of Commerce appointed an axia-tion committee, headed by former army officers. A landing field was selected. This field will be used as a landing place for the air line, according to announce-ment made here. Two biplanes will be used by the service.

Boeing Completes Navy Order for HS-2L Boats

Seattle, Wash.-The Boeing Aeroplane Co. has completed its contract with the On has completed its contract with the Navy Department for Liberty motored HS-2L flying boats. The order originally called for fifty of these craft, but upon the signing of the armistice, the order was reduced to twenty-five.

Pacific Aviation Company Has Carried 500 Passengers

The Pacific Aviation Company of San Francisco, operating two Glenn Martin type TT biplanes, has already carried 500 type 11 biplanes, has already carried 500 passengers in its daily service. More planes are being acquired. B. M. Spencer and S. Purcell, formerly of the Army Air Service, are chief pilots.

On one occasion a vial of serum was delivered from San Francisco by one of the planes of this company in time to save the life of a woman in Marina.

Aircraft Protect \$70,000,000 of Western Forest

Washington, D. C.—The Air Service announces that the three sections of for-est now being protected by its aerial patrol have a total of 35,000,000,000 board feet of timber valued as follows: Tahoe feet of timber valued as follows: Tahoe Mational Forest, \$18,000,000; Stanislaus National Forest, \$19,280,000; Eldorado National Forest, \$25,000,000. The acreage under direct observation is over 1,636,000. More than thirty fires have been located and put out before material damage was done.

Missouri Ranchmen Buy Curtiss Aeroplane

Boonville, Mo.—Six large Missouri property holders have purchased an aeroplane for the rapid inspection of their holdings. The plane is a Curtiss and has been flown by its pilot, Lieut, Russell Simulation of their holdings. mons, formerly of the Air Service, from Kelly Field to Boonville. The properties range between three and four thousand acres each, and at least one of them con-sists of scattered holdings.

Three Aviation Companies Organize in Spokane

Spokane, Wash.-Two aviation compa nies are in active business and a third in of Spokane.



J. L. Justice, who has been appointed General Sales Manager of the National Wire Wheel Works

The Northwest Aircraft Company, this city, has two machines, one of which was designed and constructed by the company's own expert. Both machines have been used for exhibition purposes most successfully, and the company plans to enter commercial aviation on a comprehensive scale

The latest entry in the aviation field is the Washington Garage in Yakima, which has received two machines from Mather Field, Sacremento. has received two machines from Mather Field, Sacremento. The aviators attached to this enterprise are Lieutenants R. P. Marshall and Floyd L. Kelso, late of the United States Aviation Service. Kelso's mother had never seen an aeroplane, but she flew from Yakima to her home in Kennewick with her son the day after his machine was delivered. The machine will be used for exhibition and instructional purposes. The company will

instructional purposes. The company will operate an agency for aeroplanes.

The Western Aviation Company of Spokane is another concern from which considerable is expected. The company is understood to contemplate purchasing several aeroplanes in the very near future, and it is predicted that a substantial impetus will be given to aviation locally as a result of its activities.

Hartford Insurance Company Gets Proposal to Insure Passengers

Hartford.—The Travelers' Insurance Company is considering the proposal of an aeronautical company being formed in New York to insure the lives of pas-sengers on dirigibles which it is proposed to operate between New York and South

America. A life insurance policy would be sold with each ticket for passage. The dirigibles would be intended prin-eipally for commercial traffic and would carry only a few passengers.

Browne Aerial Express Service Now Operating The first aerial express line has been inaugurated by George W. Browne, of Milwaukee, Western representative of the Curtiss Aeroplane Corporation and dis-tributer for Willys-Overland, Inc., by two planes of the Browne Aerial Express service.

These planes, carrying a consignment of tires for the Willys-Overland Com-pany at Toledo, from the Federal Rubber Company of Cudahy, Wis., on the out-going trip and a number of Overland automobile parts on their return, just completed a successful trial trip between Milwankee and Toledo.

waukee and Toledo.
The two planes, piloted by Lieut. Milton
Elliott and Lieut. Shirley Short, originally
departed from Cudahy, Viss, with their
cargoes of Federal tires, stopping at the
Browne Avisiton Field in Milwaukee.
From there they flew to Chicago and
theuce to Toledo. On the return trip they
transported a quantity of Overland parts
to the Browne salesroom in Milwaukee.

The Use of Woodtite in Aircraft

The discovery of Woodtite, a scientific product of the Woodtite Laboratories of Modesto, California, has marked tories of laudeauo, California, has marked a new era in the wood-working industry, particularly the hard wood industry. As an industrial invention none was ever more oportune; first, because of new uses for hard wood under great stran, and, second because the best hard woods. are now much scarcer than formerly, thus necessitating more frequent use of in-

ferior qualities.

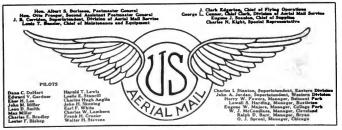
Woodtite is not a glue. It is an oil-like compound, devised to meet the universal requirements of an agent to swell shrunken wood permanently in all cases of loose joints. It also prevents warpage.

All wood is subject to swelling, shrinkage or warpage from climatic variations, no matter how much care is exercised in no matter now much care is exercised in seasoning. Constant strain and severe service will also upset the exactness of joining and turning, be the workmanship ever so perfect. Hence the vital need of a neutralizing agent like Woodtite.

Hitherto Woodtite has been used chiefly ritherto woodite has been used chiefy in a product with the well known trade name of Spoktite for tightening loose wooden automobile wheels. It was an urgent need in this respect that really caused the invention of Woodtite. But now its use has extended throughout the whole wood-working industry. It has been found invaluable in fine cabinet and furniture making, and it is now being tried in aircraft construction where per-fect joints in all wood-work is important for stability and permanency.

The Woodtite Laboratories at Modesto,

The Woodtite Laboratories at Modesso, California, have the best chemists and mechanics available, constantly at work on all sorts of tests for wood-work in on all sorts of tests for wood-work in extend advice and the benefits of their researches to all who apply for assistance, without cost or liability to the enquirer. The makers of wooden parts for aircraft are especially invited to avail themselves of this source of co-operation themselves of this source of co-operation and information.



R.34 Mail Arrives Eleven Days Sooner Copies of New York newspapers of July 7, 8, and 9, the issues which were brought to England by the R.34 and ditivered in London on July 13, were distributed through the ordinary steamship mail on July 24, eleven days later.

Curtiss Mail Plane Holds New York-Bellefonte Record

One of the new Curtiss HA mail manner the beauting the common of the Post of t

Aerial Mail Strike Settled

The strike of the aeroplane mail pilots is definitely settled and the mails between New York and Washington and New York and Chicago are arriving and leaving on schedule. The settling of the strike was the result of a conference between six of the striking pilots and Qtto Praeger, Second Assistant Postmaster General, in Washington, on July 27.

strike was the result of a conference between six of the striking pilots and Onto the striking pilots and Onto General, in Washington, on July 27, Headed by Polto T. H. Auglin, the pilots went to Washington to lay their demands before Mr. Praeser, and emore than 500 hours' experience in the air could be better relied upon to judge weather conditions than the postoffice automatic than 500 hours' experience in the air could be better relied upon to judge weather conditions than the postoffice automatic than 500 hours' experience in the pilot man of the pilot p

Although the details of the conference were not given out, the Postoffice Department authorized a statement that a satisfactory conclusion had been reached and that the strike was the result of a misunderstanding.

The six aviators who refused to fly on July 25 with mail from New York to Washington and to Bellefonte, Penn.,

and from the latter city to Cleveland have been reinstated. They were dismissed for refusing to obey orders. However, the two pilots, Leon Smith and E. Hamilton Lee, whose dismissal on July 22 was directly responsible for the strike, have not yet been reinstated, it was said, as their cases would require further investi-

The striking pilots claimed that when Smith and Lee refused to fly, there was a heavy rain and dense banks of mist. Flying under such conditions in the last two months, they said, had resulted in several accidents.

The visibility on July 22, when the aviators refused to fly, was said to be barely 100 yards. The R-4 mail planes drive ahead one and two-thirds miles every sixty seconds. They do not function properly at an altitude lower than 800 are not equipped with stabilizers, which, in case of log, would inform the pilot whether he was flying right side up or upside down. The department thought them too expensive, it was said. The pilots said they cost \$75.

Under such conditions, the pilots declared, any mail plane which took the air in rain and mist would be driving at a precariously low altitude over cities and villages at the rate of 100 miles an hour.

In reply to these charges Assistant Postmaster General Praeger made this

"My attention has been called to newspaper statements containing charges said to emanate from air mail pilots. These charges, if they were true, are not sineere. They were not made before the dismissal of the two pilots in question and would not have been made if these two pilots had been reinstated or have been permitted to have their own way in the matter of the selection of types of planes to

fly the mail.

"Any statement that a Curtiss R-4 plane with a Liberty motor is an unself-ship is a calumny on our aeroplane industry. The statement that this type of plane cannot let flown at less than one hundred miles an hour is fable and the pilots who are almost to its utmost limits of performance to get one hundred miles and hour jot is the state of t

"There is no truth in the statement that the Postoffice Department is refusing to equip planes with gyroscope turn indicators. These instruments are in course of further development and refinement

and are not obtainable in quantities on the market as yet. The indicators for the air mail service which are being developed will require two months' further work. The indicator will have to be further perfected, and this is what the Postoffice Department expects to accomplish.

"The department, however, cannot leave the question of when to fly and when not to fly in each instance for the judgment of a dozen different aviators. If the were done, it would be impossible to operate a mail schedule with any degree of dependability and the air mail would have to be abandoned."

First Aerial Trans-Atlantic Express Package on Display

New York, N. Y.—The shipment of platinum which was brought over by the great British dirigible R-34—the first ever to make the aerial passage—is now on exhibition in the window of Dreicer & Co.,

the Fifth Avenue jewellers.

The company announces that this precious consignment will be made into
medallions commemorating the historic
bridging of the Atlantic by the lighterthan-air type of aircraft.

New Bellefonte-New York Record

A record flight of ninety minutes from Bellefonte, Pa, to New York, on the last leg of the Chicago-New York route, was made by Pilot Stevens, who arrived at Belmont Park, L. I., at twenty-seven minutes before one o'clock on July 26, following the resumption of aerial mail service after the recent strike.

Aerial Weather Bulletin Issued

Washington, D. C.—The twice daily actial weather builetin is now being is sued by the Air Service at all army flying fields, forgeasting the conditions for flying for twenty-four hours, from 9:33 been divided into zones, and the flying fields within each zone will receive the reports covering their locality. In addition, a special report will be telegraphed points named in the request, which should

state the time of the contemplated start. Daily observations at various altitudes will be taken by the Balloon Division at the following points: Arcadia, Fla.; Fort Omaha, Neb.; Akrom, Ohio; San Antonio, Tex.; Hampton, Va., and from the Cal.; Allessandro, Cal.; Sacramento, Cal.; Allessandro, Cal.; Sacramento, Cal.; Rantoni, Ill. Il Houston, Tex.; Americalus.

Rantoni, Ill. Houston, Tex.; Americus, Ga.; Washington, D. C.; New York, N.Y.
The data obtained will be handed the Weather Bureau and used in connection with reports received by them to aid the aerial forecast.

THE DE HAVILLAND AEROPLANES

The D.H. 1

A FEW months before the outbreak of war the Aircraft Manufacturing styled, the Aircraft Manufacturing styled, the Airco, were forfunate enough of the Airco, were forfunate enough at the RA.F.) Geoffrey de Havilland, who had up till then been engaged as designer at the Royal Aircraft Factory (now Royal Aircraft Factory (now Royal Aircraft Estabhishment), al Farnborough. Havilland for the Airco, made its appearance early in 1915. It was a two-seater of the pusher type, and during the prediction of the Aircraft Establishment of the Airco, made its appearance early in 1915. It was a two-seater of the pusher type, and during the prediction of the Airco, and the Aircraft Sandard of those days. Although originally designed for a more powerful engine, the its power—the engine fitted was a 70 HJP. Renault—and was inherently stable to a very great extent, de Havilland flying it is seats so arranged in tandom that the gunner was in the front seat. The pilot sat behind the gunner and his seat was placed somewhat higher.

The D.H. 1A

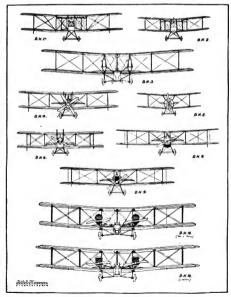
The D.H. I was followed by the D.H. IA, which was practically identical, except that it was fitted with a 120 H.P. Beardmore engine. On the D.H. 1 the shock-absorbing arrangement consisted of coil springs taking the load, while the reaction of the property of the proper

The D.H. 2

After the D.H. 1A came a little machine which startled everybody by what was in those days considered fine speed, ad, especially, an excellent climb. This was D.H. 2 a little single-seater pusher cupies. When D. H. 2 came to be turned out in quantities it soon became a favorite for certain classes of work, and was used with great success on the Western front in the days before synchronized machine guns became the fashion. When this hapdisappeared, and as this type could not be got to do the performance of tractors with the same power, it gradually exased to be used. For comfort in flying, however, it is doubtful whether this type can be surpassed. There is no slip stream, and placed as he is in the extreme nose and placed as he is in the extreme nose matter of fact, is only left on a turn. The theory held at one time that this type is dangerous on account of the engine being behind the pilot is not we are not by any means certain that for pleasure flying the now rather despised pusher should be regarded as a thing of the past. As far as the Airco. is cone-time that the pilot is not we have the properties of the past. As far as the Airco. is cone-time that the pilot is not the place of the past. As far as the Airco. is cone-time that the pilot is the pilot is not pleasure should be regarded as a thing of the past. As far as the Airco. is cone-time that the pilot pleasure that pilot pleasure that the pilot pleasure that pilot pleasur

The D.H. 3

While thus engaged upon the production of small pusher scouts, Capt. de Havilland foresaw the need for larger weight-carrying machines, and designed a twin-engine machine which became known as the D.H. 3. It was a fuselage biplane with the engines placed between the planes and the fuselage placed rather low down. The latter feature somehow gave the machine an appearance of being as someone put if, a flying-local on a someone put if, a flying-local on the place of the plac

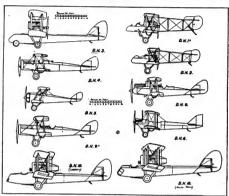


Front views of the De Havilland aeroplane

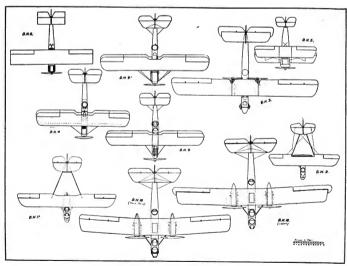
further tended to make her resemble a flying-boat.

The D.H. 4

The next design to leave the drawing table of Capt. de Havilland was a two-seater tractor, D.H. 4. The power of the seater tractor, D.H. 4. The power of the considerably, and it was possible to hope for much better performances from two-seaters than had hitherto been the case. This was the object of the D.H. 4. So use his machine-gun, his seat was placed far aft in the body, where he is well clear of the wings. The first D.H. 4 to make a B.H.P. engine of about 200 HzP, but later on engines of other makes were installed with great success. An examination of the accompanying tables will show various engines that have been fitted from time to time. The high efficiency of the D.H. 4 has enabled the Royal Air Force than the control of the accompanying tables will show various engines that have been fitted from time to time. The high efficiency of the D.H. 4 has enabled the Royal Air Force which acroplanes are used. It has done long-distance reconnaissance, bombing, photography, fighting, etc., and has also been extensively used for long-distance reconnaissance, bombing, photography, fighting, etc., and has also been extensively used for long-distance reconnaissance, bombing photography, fighting, etc., and has also been extensively used for long-distance reconnaissance, bombing and the properties of the power properties of the properties of the



Side views of the De Havilland aeroplanes



Plan views of the De Havilland or "Airco" aeroplanes

	4		ing		ing	l y	fing are	4.0	It	od-			49	Dibe	dral-	4		Area			Area.	
Type of machine.	ngth o.	-	un.		ord.	-				ace.	6	Stagger.	eeppa			20 80	. 6			-	1 i	7
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H. 94 H. 10‡ H. 10‡	30 5 18 10k	43 48 45 114 62 9 65 6	42 48 45 118 62 9 63 6	5 6 5 9 7 0 7 0	5 6 5 9 7 0 7 0	214'3 223'0 249'01 427'4 429'2 429'3	311-0 137-70 407-4 408-2	434.0 486.75 534.8 537.4	7.0	5'0 7'0 7'0	3 8 8 3 6 3 6 7 0 7 0 7 0 7 0	000000000000000000000000000000000000000	0 4	3.0 4.3 4.3	3.0 3.0 4.3 4.3	88:0 74:36 100:S	75.3	24'0 84'0 46'0 35'08	62.0 62.0 62.0 117.6 108.38 208.38	5°4 10°0 10°0	13.7 13.7 25.75 25.75	35.

over the top of the upper plane. Also the shape of the nose when fitted with a vertical B.H.P. engine has naturally been somewhat different from the nose of the R.-R. engine one. No fundamental the R.-R. engine one. No tundamental changes have, however, been made. It might be mentioned, as it is not shown in the table, the figures of which refer to the standard performance—that a D.H. 4 with a 200 H.P. B.H.P. engine has actually with a 200 H.P. B.H.P. engine has actually been flown at speeds varying from 42 to 127 M.P.H., which is "some" speed range. The covering of the fore part of the body of the D.H. 4 is of three-ply wood, which was a somewhat unusual feature in a British machine at that time.

The D.H. 5

The pusher scouts having become obso-lete, partly on account of the relatively poor performance of this type of mapoor performance of this type of ma-chine, and also by reason of the adoption of the synchronized machine gun. Capt. de Havilland set to work to produce a tractor scout in which he aimed, not only at drawing full advantage of the better performance inherent to the type, but also at providing, to as great an extent as possible, the same good view in a forward and be, the same good view in a forward and pusher scout. The outcome of these efforts was the D.H. 5, in which the chief characteristic was the negative stagger, the machine, and when she first appeared there were those who were inclined to regard her as a freak. It was not very long, however, before flying test demonstrated the machine, and the same than the provided that the control of the same than the sam formance inherent to the type, but also at

strated that her performance was good for her power, and from the reports or pilots who had flown her it appeared that she was not unduly difficult to handle. That she had her own little idiosyncracies which had to be learned and humored may be admitted (every machine has), but after pilots got into her ways she soon became popular, and during 1917 she was in great numbers with good suc-Although fitted with a slightly more powerful engine than was the pusher scout—a 110 Le Rhone against a 100 scout—a 110 Le Rhone against a 100 Gnome monosupape—it is interesting to compare the performance of the two types. The ground speed of the D.H. 2 was about 93 M.P.H. while the D.H. 5 does 105 M.P.H. at 6,500 ft. The climb to 10,000 ft. was accomplished by the pusher in 18 min, 30 sec, while the tractor does it in 12 min, 4 sec. 1t would, therefore anoact that the advantage of therefore, appear that the advantage of the tractor is greater in the case of speed than as regards climb. One is the fea-tures of the body design which is out of the usual run of bodies is the manner in which the rectangular section fuselage is In section it is an irregular octagon while in side view the corners of this octagonal section forms straight lines.

The D.H. 6

Towards the end of 1917 the nucstion of training pilots became pressing, and the need for a machine designed especially for school work became apparent. To meet this demand the D.H. 6 was designed. The objects kept in view in de-signing her were: Simplicity, and there-

fore ease of manufacture, maintenance and repair, interchangeability of parts, low landing and stalling speeds. Hence the straight tips and control surfaces. The flat, and nearly vertical, nose of the fuselage might be thought to offer unfuselage might be thought to oner un-necessary resistance. It should be re-membered, however, that this is a school machine, and we believe we are correct in saying that this detrimental surface was intended to assist in safeguarding the machine against being dived at too high a speed by inexperienced pupils. For the same reason plain cables are used in the wing bracing. An ingenious quick-release dual system of control is fitted, by means qual system of control is nited, by means of which the instructor can cut out the pupil completely by the movement of a single lever, and it should be particularly noted that this quick release includes not only alleron and elevator, but also rudder control. A remarkable feature of the der control. A remarkable feature of the D.H. 6 is the low speed at which it can be flown. The standard machine has a maximum speed of 75 M.P.H. and lands at about 30 M.P.H., while it may be actually flown at speeds below 30 M.P.H. The standard model is intentionally made slightly unstable for purposes of teaching, but a few slight modifications will turn it in the standard model in the slightly made slightly unstable for purposes of teaching, but a few slight modifications will turn it in a standard model in the slightly made slightly unstable for purposes of teaching. it into a stable machine. Furthermore, by fitting streamline wires instead of the wing-bracing cables and by cowling-in the engine the maximum speed can be in-creased to 90 M.P.H. In this form the machine should be very well suited to pleasure flying, especially as it was pri-marily designed for cheapness of manu-

(Continued on page 982)

		T	able of w	reight	s, et	c., an	d per	forms	ince o	f "Air	'co ''	machi	nes.				
Type of	Engine.		Weight of machine	Fuel capacity. (galions.)		Range (in miles).	Speed (m.p.h.),			Climb (in mins.) to		ing.	Sta'ling speed.	anding speed.	oad/sq.ft,	Load/h.p.	d.
machine.	Type.	H.P.	(loaded). lbs.	Petrol.	Oil.	Ra (in m	6,500	10,000	15,000	10,000	15,000	T Ceiling	m.p.h.	m.p-h.	Ibs.	lbs.	F Military load.
D.H. 1A D.H. 2 D.H. 3 D.H. 4 D.H. 4 D.H. 4 D.H. 4 D.H. 5	B. G.M. 2, B. B.H.P. R.A.F. 3A RR. Le Rh. R.A.F. or Curtiss	120 100 120 200 200 250 370 110 90	2,400 1,320 5,776 3,246 3,340 3,409 3,472 1,492 2,000	66 65 5 65 66 26 25	5 4*5 5*5 4	500	120 117 136·5	117.5	104 110·6 102·5 126 89	16.4	35·5 29·3 36·7 16·6	19,000 19,000 19,000 23,500 17,000	42	52 52 52 52 50 30	5°3 9°2 7°4 7°7 7°8 8	20 13·2 24 16·2 16·2 13·6 9·4 13.6	520 200 680 543 543 543 543 260
D.H. 9 ,. D.H. 9 ,. D.H. 9A ,.	B.H.P. Lion L. 2L.	230 420 400 400		712	12 61 15 24	650	129	140	101 135. 114 117	11.8	22.8	19,000 25,300 21,000 20,000	45	50 55 55	8.5	8.8 10.5 10.6	54 54

RESISTANCE DUE TO NOSE RADIATOR

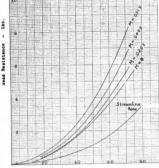
1ND tunnel tests on a model fuselage show the follow-

(1) At any given plane speed the total resistance of a fuselage with a flat nose radiator is increased by increasing a tuseiage with a hat nose fadiator is increased by increasing the air flow through the radiator, either by opening exit vents for the air or by decreasing the resistance of the radiator to passage of air. This shows that a nose radiator—in contradistinction to a free air radiator—should be of compact construction with high heat transfer for low air flows through the core, therefore requiring a core of high resistance.

(2) With varying plane speeds the relative efficiencies of free air and nose radiators do not change.

(3) With all three widely differing types of core tried, the combined resistance of the fuselage and a free air radiator of given cooling capacity was from 10 to 50 per cent less than that of the fuselage with a nose radiator of the same core con-struction and equivalent cooling capacity.

(4) From other experiments performed at the Bureau of Standards it is clear that there is more chance for improvement in types of core for free air positions than in types of core for the nose position.



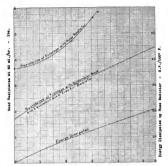
Plot 1. Free Air Speed—miles per hour (V)
Resistance with various air flows (M) in lbs. per sec. per sq. ft.
front, when V = free air spéed ln ml. per hr., compared with
fuselage having streamlice note. Core No. A-23, Livingston
5/16° aq. cell, 5° dec.

The present report considers the effect of placing a radiator in the nose of a fuselage as compared with the effect of placing a radiator of the same core construction, having an requivalent cooling capacity, in the free air and streamlining the nose of the fuselage The results of these tests indicate the nose of the fuselage. The results of these tests indicate less difference than would be shown by comparing results with radiators specially selected for each of the positions in which they were placed.

The results are qualitative only, but they are so striking as to indicate that the nose of the fuselage is not a desirable location for a radiator from the point of view of head resist-

A model fuselage 60 inches long, 10 inches wide and 13 inches high was constructed with a removable streamline nose, which, when removed, allowed an 8-inch square section of radiator core to be placed in the nose. Two holes on each side of the fusclage, each about 1½ by 6/5 inches, were cut about a foot back from the nose and fitted with adjustable sliding doors. By adjusting these vents the amount of air passing through the nose was varied.

The model was mounted in a 54-inch wind tunnel and the head resistance measured under the following conditions:

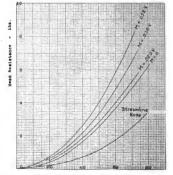


Mass Flow of Air—ths. per s. A-23, Livingston 5/16" sq. cell, square to nose of model 60" to high. Free air speed 60

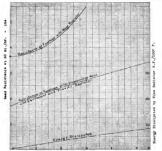
(1) Streamline nose on model. (No change in resistance

was observed whether vents were open or closed.)
(2) Streamline nose removed, but nose radiator covered (2) Streamline nose removed, but nose radiator covered with a sheet of paper so that there was no air flow through the core. (3), (4) and (5) Nose radiator in place with vary-tor cight different air speeds were tried in each case, the maximum being 70 miles per hour. The results of these runs are given in plot 1, against free air speed. They show (1) that the streamline nose decreases the resistance of the fusedage by 50 per cent, and (2) that the total

resistance of the fuselage increases rapidly when air is allowed



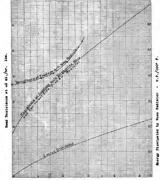
Pint 3. Free Air Speed—miles per hour (V)
Resistance with various air flows (M) in lbs. per sec. per se
frost, when V = free air speed in mil. per hr., compared
fuselage having streamline nose. Core No. B-1, Candler
hex. cell, 2/3 is. deep



Plot 4. Mees Flow of Air—ibs. per sec. per sq. ft. front Core No. B-1. Section of core 8" square in nose of model 60" long, 10" wide, and 13" high. Free air speed 60 M.P.H.

to enter the radiator, so that a compact type of core is desirable for this position.

Plot 2 illustrates these conclusions more clearly, since there the resistance of the fuselage at 60 miles per bour free air speed is plotted against the mass flow of air through the radiator. There is also plotted the total resistance of the fuselage with a streamline nose, together with a free air radiator of the same core construction and of such size as to have a cooling the same core construction and of such size as to have a cooling the same core construction and of such size as the air cooling eye mass flow. Plots 3, 4, 5 and to give the aime data for two other cores, 3 and 4 being for a core of very low head resistance and 5 and 6 for a core of very high head resistance, which would be a very good type for a none radiator, and a very bad type for free air. These are types of core considerably better for free air positions than those included in this test, while the core represented in plots 5 and 6 is probably one of the best for the nose position.



Plet 6. Mass Flow of Air—ths. per sec. per sq. ft. front Core No. G-3. Section of core 8" square in ness of model 60"

Conclusions

Based on the results of these wind tunnel experiments on a model fuselage, it is concluded that: (1) The resistance of a fuselage with streamline nose is

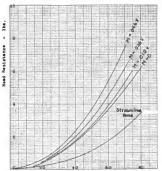
(1) The resistance of a fuselage with streamline nose is increased more by removing the streamline nose and substituting a radiator than it is by adding an equivalent free air radiator and retaining the streamline nose.

(2) Between good radiators for each position the increase of resistance due to the nose radiator is roughly double that

due to the free air radiator.

(3) Above a very low mass flow, the nose radiator becomes relatively worse and worse as the mass flow is increased by opening the vents at a constant free air speed. This fact is of great importance, since the space available for a nose radiator is so limited that the highest possible mass flows are used in

(4) It is found that the relative efficiency of the nose radiator and the free air radiator does not change appreciably with free air speed for a given setting of the vents.



Plot 8. Free Air Speed—miles per hour (V) Resistence with various air flows (M) in lbs. per sec, per eq. ft. front, when V = free air speed in ml. per hr, compared with fuselage having streamline noise. Core No. G-3, Spirez, 3% in, deep

Gluing Veneer at High Moisture Contents

It is common practice among plywood manufacturers to dry venered nown to very low moisture contents before gluing it. The object in doing so apparently is to prevent shrinkage of the vener and consequent marring of the appearance of the finished panel. The drying is done in plate redriers, the cost of manufacturing panels.

That such preliminary drying may not be necessary is indicated by the results of a recent investigation by the Forest Products Laboratory. Vener panels were glued with casein give at various high moisture contents (some

That such preliminary drying may not be necessary is indicated by the results of a recent investigation by the Forest Products Laborators have been panel were glised over 50 per cent), and in various high sensitive of a strong and as desirable as those made under drier conditions. In fact, in the moisture resistance tests a considerable proportion of the production of failure, whereas wener glued at a moisture content of 15 per cent or higher gave practically perfect results. Panels made at high moisture contents checked if dried too rapidly, leat this difficulty could be avoided by proper operation of the production of the production

the kin. The possible, therefore, that the cost of producing panels of certain kinds may be very materially lessened through the use of water resistant glue and the reduction or even elimination of preliminary drying. Very dry veneer is more likely to break or split than damp veneer; an additional saving is therefore possible through a reduction of

The use of moist veneer, of course, is not practicable for some purposes, but it is quite certain that much of the veneer which is now being painstakingly dried hefore gluing might advantageously be glued at a higher moisture content.

THE SMITH PARACHUTE

HE U. S. Army, having placed very rigid requirements for parachutes, found practically all available types below the requirements for strength. Test strength consists of a test equivalent to carrying a man weighing 200 pounds, traveling at a speed of 300 miles per hour.

The chute designed by Mr. Floyd Smith of McCook Field has been developed and has passed this test on numerous occasions. Although this chute is not considered the last word and experiments are still in progress with a view to improving it, it is thought by officers of the Army Air Service to be best on the market to-day, either foreign or domestic.

This chute is of a flat type, 28 feet in diameter, with a 42-inch patent shock absorbing vent supported by 40 silk shroud lines of 250 pounds breaking strength. The shroud lines are arranged in four groups of 10 each tied to a D ring, which in turn is sewn into the harness webbing. The D ring has a strength of 5,000 pounds. and the webbing fails at 3,400 pounds. No. 8 Mommo Shantung silk, having a tensile strength of 56 pounds per inch laterally and 42 pounds per inch lengthwise, is used for fabric, which gives a strength far greater than the other parts of the chute.

The total weight of the pack complete is 12 pounds 4 ounces. Several different types of packs have been devised in order



Parachute nearing th

that they may not prove a burden to the wearer. The accompanying photographs show the pack, which is 18" x 12" x 3". carried on the back, acting at the same time as a cushion in a specially designed seat. This pack can be operated either by attaching the rip-cord to the plane, or the wearer can pull it himself, either before or after jumping, depending upon the circumstances.

Numerous tests have proved the absolute necessity of the aviator being well clear of the machine before the opening ciear of the machine before the opening of the chute to avoid having it carried into the tail surfaces by the very high velocity high stream. The advisability of velocity high stream are surfaced as the plane has been well demonstrated also. The fact that the two main conditions calling for the use of a parachute are, first, fire danger, and second, the collapse of some vital part of the plane, logically the aviator in both of these cases wiskes to clear the machine without depending on it in any way for the sucessful opera-tion of his chute. Criticisms have been tion of his crute. Criticisms have been made in regard to the inability of the aviator to separate the release, or neg-lecting to do so, but drops by men en-tirely inexperienced in parachute jumping have proved to the contrary.

Future developments will probably follow very closey the lines as described in tow very closey the lines as described in this chute in regard to operation. Un-doubtedly there is a great deal of work still to be done on the best shape of chute. Although the Smith chute can be steered a limited amount, further development along this line may be expected.



Front, side and rear views of the Smith parachute which has recently undergone successful tests at McCook Field, Dayton, Ohio



NAVAL and MILITARY · AERONAUTICS ·



55,000,000 Miles Flown in 18 Months

United States Army pilots flew 55,671,-120 miles in the eighteen and a half months, between January 1, 1918, and July

months, between January 1, 1918, and July
17, 1919, according to an announcement
made by the Director of the Air Service.
The figure is based upon an estimate of
sixty miles for each hour of flying. This is a very low estimate, since most of the planes used could and did fly at rates be-tween seventy-five and 120 miles an hour without counting the wind velocity, which at times reduced or raised their speed. at times reduced or raised their speed. The number of hours spent in the air by the army pilots was 927,852, about 106 years. It is hard to give an idea of what 55,671,120 miles means. It is equivalent to 2,227 circumnavigations of the globe at the equator. It is more than half the dis-

tance to the sun. tance to the sun. Kelly Field No. 2, at San Antonio, Tex., led all the rest in the matter of hours flown. The pilots of this field remained in the air 167,982 hours, more than nine-ten years. Ellington Field, at Houston, Tex., was a moderately good second with 95,203 hours. The reason why Texas is the banner State for flying was that its fine climate and long stretches of flat.

fine climate and long stretches of first lands, making perfect landing fields, accused it to be chosen for much of the caused it to be chosen for much of the caused it to be chosen for much of the caused at San Diego, Cal, was third on the list, with 61,659 hours flown. At Hazelburst Field at Mincola only 4,529 hours, in about 3 and 816 enlitted men in transit or at desix months, was flown.

No More Exhibitions Where Inadequate Landing Facilities Exist

Washington, D. C.—The announcement made by Major General Charles T, Menoher, Director of Air Service, to the effect that the control of the C

General Menoher in his statement re-General Menoher in his statement re-fers to an accident which occurred in Boston at the only available landing field, and which was the result of the limita-tions of the field. No flights will be reade resulting field is provided, including satisfactory means of keeping spectators off the field while landings and starts are being made.

Eighth Aero Squadron at Border

McAllen, Tex. — The Eighth Aero Squadron, consisting of 18 officers and 107 men, arrived here recently with an equipment of twelve aeroplanes.

Air Service Less Than One-Tenth War Strength

Washington, D. C.—The Air Service reports a net decrease in the total com-missioned and enlisted strength from the date of the armistice to July 10 of 91 per cent.

The following table shows the present distribution of personnel as compared with the latest revised figures of Novem-ber 11, and the per cent decrease. The



and 816 enlisted men in transit or at demobilization stations awaiting discharge.

Cadets	Nov. 11 6.483	July 10	net decrease
	167,986 20,554	13,597 4,432	92 78
omcers	105.033	10.026	01

NC-4 to Make Recruiting Flight up Mississippi New York, N. Y.—After being ex-hibited for two weeks in Central Park, the NC-4, which made the first trans-Atlantic flight in history, is being dis-mantled for shipment to the Rockaway Naval Air Station. Here she will be completely overhauled preparatory to a re-cruiting flight upon which she will be manned by the same crew which took her

manned by the same crew which took her successfully across the Atlantic.
Her stinerary will include the principal cities of the Atlantic and Gulf Coasts, probably a flight up the Mississill likelihood a visit to the Pacific Coast via the Panama Canal. California is bringing strong pressure to bear for a visit by the ship. Definite dates and stopping points have not been decided on.

150 Air Service Officers in Regular Establishment

Washington, D. C .- There are in the Air Service 149 flying officers of the regular establishment, thirteen of whom are balloonists and six observers. Of the 130 patioonists and six observers. Of the 130 pilots many have flown only the training plane. A large percentage are beyond the age limit for pursuit pilots. A minority, who went overseas and became

squadron or group commanders, are in condition for active flying duty. In the following table is shown the dis-tribution of the regular flying officers by rank. Of 130 captains of the line, 121 rank. Of 1.90 captains of the line, 121 hold military aviator or junior military aviator ratings, which makes them majors in the Air Service, and of the fourteen first lieutenants of the line three hold the same ratings which advances them one grade in the Air Service.

т.	minora r	Rank held y as M.A.	Regular
	rank	or J.M.A.	rank
Brig. General Colonel	17		
Lt. Colonel	50	.,	*;
Major	66	123	2 0
Captain	8	10	130°
1st Lieut 2nd Lieut	6	11	14
and Lieut	0	3	_ 3
Total	149	149	149

* One captain retired.

Recruiting for Naval Air Service Resume

Washington, D. C .- Recruiting for the naval aviation service has been resumed.
All men in class V of the Naval Reserve, All men in class V of the Nava, AURILIE, who are now on inactive duty who are desirous of joining the regular force as aviation mechanics, may be enlisted as appendice seamen and will then be given rating in the aviation branch. These rating in the aviation branch. These men will have their choice of transfer to the aviation mechanics school at any of the following naval air stations: Chatham, Mass.; Rockaway, N. Y.; Cape May, N. J.; Hamplon Roads, V.; Key West, Fla.; Pensacola, Fla.; Akron, Ohio; San Diego, Cal.; Coco Solo, C. Z., or the Naval Training Station at Great Lakes,

NC-2 to Be Put in Commission

Washington, D. C .- It is stated that the Washington, D. C.—It is stated that the NC-2 will be repaired and placed on active duty. This flying boat differs from her sister ships in that her four motors are arranged in two pairs of one pusher and one tractor units. The NC-4 is to be placed on exhibition at the Smithsonian Institute. The NC-1 is at the bottom of the Atlantic and the NC-3 is dismantled and in storage.

Air Service Represented On Pyrotechnic Signal Board

Washington, D. C .- A Board of Officers is being convened to meet on August 1, 1919, at Ft. Sill, Oklahoma, for the purpose of developing a system of pyrotechnic signals and drawing up specifications for suitable pyrotechnic material. fications for suitable pyrotechnic material. The following officers constitute the Board: Lieut. Colonel W. B. Harding and Major A. B. Quinton, Ordanace De. Cavalry: Lieut. Colonel E. R. Coppock. Infantry: Captain D. H. Arthur, Air Service, and Lieut. Colonel H. Parkhurst, Field Arillery. It is directed that the Chief of Ordanace. Director of Air Service and Commanding General of Fort Sill render such assistance as is desired hy the Board where such is possible,





FOREIGN **NEWS**



Aeroplane Transport Scores Best for London Paper plane for the depression is afforded of the superiority of the aeroplane for, fine object-tienon is afforded of the superiority of the aeroplane for, in the health which, Mr. Wed Pirce, the Dishy Made corresponded in the control of the contro

Argustina Aviators Arranging Plymouth-Buenne Ayras Flight
from the Moss Sulth America, Capt, Angel M., Zulisaga Comb
manded; Brigar men flows Sulth America, Capt, Angel M., Zulisaga Comb
manded Travella (mechanic), are visining London with a view to completing
proparations for a flight from Plymouth to Buenne Ayres vie Pertugal
man Africa, some 6,000 miles, the Atlantic croming, representing solved
The flight may be made in an F5 flying boat if one can be purchased
from the British Government.

Airship Service Between Milan and Venice Milan and Venice in Milan and Venice in Milan and Venice has been inaugurated. The directle """ of left Baggio, near Milan, with 30 passengers on board, on June 23, while at about the same time the "N. 14" left Campalie, near Venice, carrying 20 passengers. Both airships are said to have made the journey successfully.

Aerial Mail Service to Foreign Countries Contemplated by London—An aerial mail service to foreign countries its being service countries in being service countries in the service construction of the comparative (see boart, exception of the comparative) (see boart, exception of the comparative) (see boart, exception of the construction of the comparative) (see boart, exception of the construction of the c

a comparatively few hours, revolutionizing mail transportation.

The Dunish Government Bay laken a decided step in lease the direction of the general contract has taken a decided step in lease the direction of the general contract and the supplier of the property of the supplier of the

It is reported that Government planes, acouting for Villa bandits, sighted a unit of Government infantrymen under the command of General Pablo Gueroga, and dropped a number of bombs among them. The causalizes are not yet reported.

French Government Plans Long Distance Flights Over Eurapean Capitale
Paris.—The French Aeronaudical Department has arranged for a series
to long-distance flights to be made by war pilots over various capitals.
Amsterdam, and Cairo (via Constantinople) are included, Trips will also be made to Tunis, Algiers, and Daiar (West Africa).

Paria—The French Aviation Blassine for Turbers,

Paria—The French Aviation Blassine for Turbers
for the establishment of an Aviation Blasson in Turber, entrusted with
for the establishment of an Aviation Blasson in Turber, entrusted with
Greeian Archbeelage: Constantinople, Palentino, Meas, Egryt; Constantinople, Armenta, Caston, French Establishment, Stantinople, Stantinople, Palentino, Stantinople, Palentino, Stantinople, Palentino, Stantino, French Stantinople, Stantino, French Stantino, Stantino, Stantino, French Stantino, Stantino, French Stantino, Stantino,

Stockholm.—A trial flight of an experimental midget aeroplane con-structed at the Paalson works of Molmoe is reported to have been

successful. The machine is said to weigh only 700 lb., and is capable of carrying another 400 lb. The body is described as chaped, and constructed so as to reduce the air resistance to a mining It has a Thulin 50 h.p. Gnome engine of special construction, cap of giving a speed of about 30 miles an hour.

The A. V. Area Passeages Carring Service Profitable
The A. V. Area Passeages Carring Service of Leet. Col. 1. P. Henderson and of Co. have secured the services of Leet. Col. 2. L. P. Henderson and on the Hennever Leet Passeage Carring service. The services or its Hennever, although this locality is said to be consistent to the Leet. Col. 2. L. P. Leet Leet. Col. 2. L. P. L. P.

Destach De La Meurthe Gives Two Million France for Flying Meets Paris.—M. Henri Deutsch de la Meurthe, President of the Aero Club of France, has given the club a generous gift of two million france for the purpose of organizing flying meets.

tor the purpose of organizing nying meets.

Advertisements are boing earried by Gernan popers amounting that and the State of the State

Rome-London Flight Planned
The Fiat Co. is arranging for a non-stop flight from Rome to Kenley, near Croydon, a distance of 1,100 miles.

The Pint Co. is arranging for a non-kep flight from Rone to Kenley, not Croydon's Palley of Longing New Pinnas Criticals.

London—Considerable glicenstem has been arraned by the seranging of new manchines and engines, which has been going on for sensitive the serious of the s

new where of preduction to a standarill.

Aeronautical Intelligence Bureau, Lod., was incorporated on June 13th. The Act of Intelligence Bureau, Lod., was incorporated on June 13th. The Act of objects see: (A). To units and combine aero: (B) To protect the arcabese of the Society from financial risks by obtaining and distribution; information concerning firsts undeserving of those in winding up or isquidation. (D) To procure the amendment or reguel of legislation injurious by the members. (E) To procure of the property o



A section of the hangars at the Fiat Company's experimental field near Turin. Note the method of opening the hangar doors



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. MSHahan E 200 CH



PACIFIC NORTHWEST MODEL AERO 921 Ravenne Boulevard, Seattle, Wash. BAY RIDGE MODEL CLUB

BAY RIDGE MODEL CLUB

P. Ridge Beulevard, Bay Ridge, Breesley
DIANA UNIVERSITY AERO SCIENCE
CLUB
BIOLOGICLUB
BROADWAY MODEL, AERO CLUB
BROADWAY MODEL, AERO CLUB
BRI North Breedway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
BLIMERE, Md.
NEBRASKA MODEL AERO CLUB
LINCOIN, Nebrashe

CLUBS

DENVER MODEL AERO CLUB 2820 Raleigh St., Denver, Colo. BUFFALO AERO SCIENCE CLUB c/o Christian Weyand, 48 Dodge St Buffalo, N. Y.

Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, III.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bidg.,
Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB 455 Murray Ave., Milwaukee, Wit

CONCORD MODEL AERO CLUB

MODEL AERO CLUB OF CAT ORD

OTHER TO STREET

CAPTUR MODEL AERO CLUB

Weshipten, D.

AERO SCIENCE CLUB OF AMERICA

Beach But, E god ST.

AERO CLUB OF AMERICA

AERO CLUB OF LAND TECHNICAL

COLORED TO STREET

COLORED

edgwick & Division Streets, Chicago, Ill.

NTEREST in the light type aeroplane is growing, more so

and the light type aeropane is growing, more so, now than before, perhaps, owing to the returning aeroplane pilots and mechanicians released by the Government. All of these young men want to fly, and as many are unable to buy or build a large heavy motored machine they are naturally turning to the next best type, or what we call the light type machine.

The aeroplane accessory and motor firms have anticipated this, and many accessories and parts for constructing these little machines are offered for sale all over the United States. The motorcycle machine recently described on this page met with a great deal of favor from the readers, but owing to its small reserve horsepower it cannot be called a capable

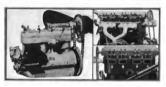
machine.

The Ford motored aeroplane, which had for its power plant a redesigned Ford motor, has been taken seriously by the area of the plant of th valves are operated by an overhead camshaft, which is driven by a chain and gear arrangement. There are four valves to

by a chain and gear arrangement. There are four valves to each cyligher, two intake and two exhaust, located overhead and seated at an angle of 20 degrees.

The valves are the state of the control of the control of the control of the forked type. Each rocker arm is operated by the overhead cambialt, which runs on three ball bearings, all of which are enclosed in an oil-tight aluminum housing. The cams are of the roller follower type, each of which drips into all and lubricates the roller end of the rocker.

There are two spark plugs to each cylinder, set below and



between the valves on each side of the head. The intake manifold is so arranged as to allow the installation of either a 13/ or 13/-inch carburetor. Of course for aeroplane work the heavy flywheel and

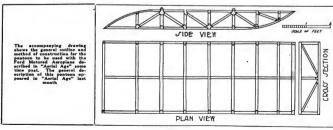
Of course for aeropiane work the neavy nywnesi and transmission is done away with, as the propeller acts as a flywheel, and if pistons and connecting rods are carefully weighed to be sure that they are all the same weight, all vibration will be eliminated and the engine should perform

The Ford motor can be successfully used in an aeroplane without the use of an overhead attachment, but if one can be purchased light enough so as not to increase the weight too much, it would be better to employ one. From time to time we will show different Ford motor inventions as well as those for other motors that will increase the power and revolutions per minute

tutions per minute.

This motor shall keep compared with the one built by P. P.

This motor shall Kain, which he used in his pusher type
aeroplane with great success, giving the hust of the property of the motor with the cylinder head bolts,
fastened to the top of the motor with the cylinder head bolts,
to which the propeller, was fastened. This motor was described in February 24th issue,





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have If so, your contribution will be welcomed by your fellow AERONUTS. a story all of your own. Initials of contributor will be printed when requested.

Dirigible Balloonacy

The Acroplane, a British publication, thus discusses an article which was published recently in an American periodical dealing with the uses of airships in times of peace. The following suggestions are made:

"The dirigible will be useful to the Bureau of Mines because it can carry prospectors at low altitudes as they search for symptoms of minerals.

'In tropical forests trees of great value can be hunted for by their flowers, leaves or other symptoms seen from above.

'In countries where migratory insects like locusts need surveillance, scientific measures can be taken to find their breeding places and sterilize the egg-laden areas. A dirigible can follow a locust cloud and by the use of gases and explosives disperse it or drive it away from valuable crops.

The Revenue Guards and the Department of Justice can use the dirigible to detect smugglers and to pursue large bands of outlaws, especially if they are mounted or have stolen live stock or property in vehicles.'

'One does not know which suggestion to admire most. The bombing or gassing of locusts appear to be the most practical and would seem to provide better sport than the hunting of trees by their symptoms.

"The pursuit of large bands of outlaws seems to offer great possibilities. Large bands would, of course, be chosen, because the smaller bodies of bandits would not have sufficient strength to pull down the dirigible in order that they might be arrested.

Has anyone suggestions of similar character to offer for the application of aircraft to commercial uses? The Aeronitis editor will be glad to receive them with a view of publishing the most practical suggestions.



-From The Dallas News

Farewell, O Pioneer

Farewell, O pioneer Of skyland's infinite realm! You fought through fog and gale, With heroes at your helm; With luck invoked, you sail. The path you bravely laid Will broaden with the coming day, The trip you dared and made Unites our lands another way, Farewell, O pioneer!

-M. J. A., in New York Times.

Overheard During the Visit of the R-34

Bystander throwing lighted match down on the ground. "I can't see why they won't let us go closer to the darn thing.

"My," said a sweet young thing, ambling about the side lines to a sweety, tired guard, "does the wind make that balloon

sway like that?" "Naw," replied the guard in disgust, "they're just feeding it meat.".

One dear old lady, with silver hair, remarked to her husband, who had no hair, "I just know it must be awfully hard for those poor men to hold on when the captain decides to

loop the loop."—Air Scout,

The moral pointed by the behavior of the R-34 at Mineola would seem to be: You can't keep a good blimp down.-Evening Mail.

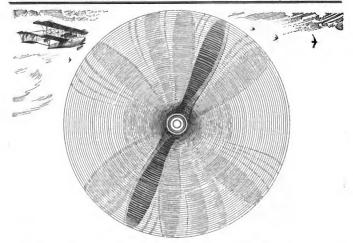
Kiwi or Kiwi-Kiwi

Kiwi-the Maori name for this queer bird-which was in-Kiwi—the Maori name for this queer bird—which was in-troduced in England by Mr. Lesson in 1823, is now generally adopted in all countries. It is easily distinguished from all its allies because of such a small body and comparatively small head and eyes. This curious flightless bird with its functionless wings and long thin legs is one of the most characteristic fowls of New Zealand. Zoologists placed at with the Pengus urines and when grasped feels very softtudinal yellow stripes and when grasped feels very soft-just as if its body contained no bones.

just as 11 its body contained no bonds. Kiwis have been seen on high hills but are met with mostly as very low levels. Parties from six to twelve were once seen but now flocks by the seen and the seen as the se of noise but cannot fly..

(Kiwis may be seen at almost any aerodrome more than two years in existence.-Ep.) References: Birds by A. H. Evans, Cambridge Natural History, Brittania Encyclopaedia.





The most terrific varnish test in history!

700 miles an hour for 26 hours-and Valspar won

DURING the trans-Atlantic flight of the NC-4 the strain on her huge Valsparred propellers was *terrific*.

The big blades, whizzing at 1800 revolutions a minute, attained at their tips the frightful speed of 700 miles per hour—a speed at which the drops of moisture striking their Valsparred surface had the impact of buckshot.

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Never yet has any varnish been called on to undergo such a terrific test. Had even a very little water penetrated the varnish, the tips of the

blades would have begun to "fray." Then the laminated strips would have swelled and separated and the blades of the propellers would literally have flown to pieces, landing the NC-4 on the ocean, helpless.

But Valspar protected these laminated propeller blades perfectly, as it did all other varnished parts of the NC-4.

Valspar's toughness, elasticity and waterproofness made good for the U. S. Navy in this severe trial. It is the one varnish that can be absolutely depended upon under all conditions of air service.

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New York Chica Boston VARNISHES (Trade Mark

W. P. Fuller & Co., San Francisco





and Principal Pecific Coast Cities

(Continued from page 971) The D.H. 7 and D.H. 8

We now come to a short gap in the series of D.H. machines. The next two types, we understand, never got any fur-ther than the drawing-board stage, and we have not been able to obtain any particulars of them.

The D.H. 9

The experience gained with the D.H. 4's demonstrated that placing the pilot in between the planes did not tend to give him an ideal position for fighting, and also when bombs had to be carried little also when bombs had to be carried little space was left in the part of the machine where they could be most suitably placed; that is, in the neighborhood of the cp. These drawbacks were remedied in the D.H. 9, by rearranging the pilot's seat considerably farther aft than it was placed in the D.H. 4, and, of course, readjusting the position of other weights in relaing the position of other weights in reta-tion to the wings so as to maintain the longitudinal trim of the machine. The fitting of a vertical engine instead of a Vee enabled the designer to narrow down the front portion of the fuselage considwhich resulted in a fuselage of beautifully clean lines with, it may be assumed, a comparatively low resistance. One of the features which has helped to give this machine its clean appearance is the placing of the radiator, not in the nose, as in the D.H. 4, but in the floor of the body. An ingenious feature of this radiator mounting is that the radiator can be moved up or down, thus varying the cooling to any desired extent by blanketing a larger or smaller portion of the ing a larger or smaller portion of the cooling surface. The machine has been extensively used for fighting, reconnais-sance, photography, etc., and also by the Independent Air Force for long-distance bombing by day and by night. It was the D.H. 9 which was largely used for

the day bombing raids on German towns. In connection with the D.H. 9 it is of interest to note that one of these machines, fitted with a 420-H.P. Napier Tilon" engine did a speed of 140 M.P.H. at 10,000 ft., which altitude it reached in the extraordinary short time of 8 min., 10 sec. The same machine, furthermore, had a ceiling of 29,000 ft., although with a load slightly lighter than the standard.

The D.H. 9A

With the insistent demand for better and still better performance the necessity of fitting engines of greater power became urgent, and the D.H. 9A was produced to meet these demands. Except for the front portion of the body it was not greatly different from the D.H. 9. It has, however, a somewhat larger area, so as to obtain the same landing speed for the heavier weight. The object had in mind when designing the D.H. 9A was mind when designing the D.H. 9A was to provide an improvement on the 9, namely, to carry a greater load while maintaining a high performance. Apart from being extremely useful for long-distance reconnaissance, photography and fighting, this machine has been largely used for long-distance day bombing raids The accompanying table will give a good idea of the manner in which the designer idea of the manner in which the designer succeeded in attaining his purpose, and it is of interest to mention the following facts in addition: By increasing the military load from 545 lbs. to 945 lbs. the speed at low altitudes is reduced to 125 speed at low altitudes is reduced to 125 M.P.H., and at 10,000 ft. to 114½ M.P.H. The climb to 10,000 ft. with this load occupies 1505 minutes and the ceiling is 19,000 ft. The range is reduced to 620 miles. (The reduction in speed is largely due to the fact that the extra load in bombs is carried outside.) By way of bombs is carried outside.) By way of showing the weight-carrying capacity of

this machine it is of interest to note that

this machine it is of interest to note that it has flown successfully with a military load of 1,325 lbs.

A machine of this type has also been fitted with a 360 H.P. Rolls-Royce engine, and, carying a military load of 1,745 lbs., reached a ceiling of 16,500 ft with a speed of 107½ M.P.H. at 10,000 ft. This machine differed from the stand of 0 at 1,000 ft. ft. This machine differed from the stand-ard 9A in that its fuel tankage was only ard 9A in that its tuel tankage was only 71 gallons, having a larger margin for load. It should also be noted that the above speed was reduced by about 4 M.P.H., owing to the bombs and carriers being out outside.

The D.H. 10 and 10A

The object in designing this machine was to produce a high performance, selfdefending, long-distance daylight bomber. The armistice came along before the D.H. 10's were built in great numbers, and so this type has not had the opportunity of proving itself to the same extent on active service as have the other types of D.H.'s. Judging from its performance, however, it is safe to say that it would have proved it is safe to say that it would have proved a formidable antagonist. It will be seen from the table that when carrying three men, 1,000 lbs. of bombs, full military equipment, and sufficient fuel for a flight of 700 miles, the performance is so extraordinarily good as to be superior to any German machine of ony type wahesoever. The machine would, therefore, be able to go out over the lines with its tanks full for a long journey and with a heavy load of bombs, and yet be entirely imload of bombs, and yet be entirely im-mune from enemy attack by aeroplane. This may be regarded as an achievement to be proud of in a daylight bomber. The manœuvrability of the D.H. 10A is a good as is its performance, and one of these machines has been looped by the late Capt. B. C. Hucks.

BOOK REVIEWS

AVIATION ENGINES, by Lieut. Victor W. AVIATION ENGINES, by LIFEL, PAGE, A complete practical treatise out-lining clearly the elements of internal combustion engineering with special ref-erence to the design, construction, operaerence to the design, construction, opera-tion and repair of aeroplane power plants; also the auxiliary engine systems, such as lubrication, carburetion, ignition and cooling. It includes complete instructions for engine repairing and systematic location of troubles, tool equipment and use of tools, also outlines the latest me-chanical processes. Price \$3.25, post paid.

AFRONAUTICAL ENGINES, by Francis John Kean. This volume has just been revised and enlarged and therein is comrevised and enlarged and therein is com-prehensively explained several types of aeroplane motors, such as Curtiss, Mer-cedes, Gnome, Anzani Ten-Cylinder Ra-dial Air-Cooled Aero engines, etc. It also contains numerous plates and is fully illustrated. Price \$2.75, post paid.

DYKE'S AUTOMOBILE AND GASOLINE EN-GINE ENCYCLOPEDIA. The author has brought out this 1919 edition to further educate the readers of this Encyclopedia and to broaden their knowledge on points overlooked in previous editions. If you are interested in engines of every descripare interested in engines of every descrip-tion and type, such as those installed in automobiles, motorcycles, motorboats, aeroplanes, etc., you should be an owner of this volume. It is valuable on account of its complete and thorough information. Price \$4.50, post paid.

HIGH SPEED INTERNAL COMBUSTION EN-GINES, by Arthur W. Judge. This volume is the outcome of an endeavor to collect and to classify, in as brief a form as possible the more important information re-lating to the subject of high speed inter-nal combustion engines, as viewed from the theoretical and experimental sides. It treats of the thermodynamics of the internal combustion engines, explosion and combustion in the engine, conditions occurring in actual engines, pressures and temperatures in internal combustion engines, indicators and indicator diagrams. mechanics of the high speed internal combustion engines, and engine balance. It is fully illustrated and contains many valuable tables. Price is \$7.50, post paid

THE A B C OF AVIATION, by Victor W. Pagé. A non-technical manual, containing instructions for lining up and inspecting typical aeroplanes before flight and also gives easily understood rules for fly-It treats of aeroplane fuselage construction, power plants, propeller con-struction and action, equilibrium and control principles, uncrating, setting up, and aligning, inspecting aeroplane before flight, and also contains a most complete nomenclature of acronautical terms. Price \$2.75, post paid. THE PRINCIPLES OF AEROFLANE CON-STRUCTION, by Rankin Kennedy. This work is intended to show the principles of the aeroplane as applied to flying machines and to put in as concise a form as possible the theory of the plane, commencing with the elementary laws of mechanics and the inclined plane, afterward giving the formulae for the determination of the principal dimensions of the aeroplane in the simplest form, with numerically worked out calculations on the two sys-tems in use. Price \$2.20, post paid.

PRACTICAL AVIATION, by Charles B. Hayward. A thoroughly comprehensive volume treating of several phases in aeronautics, such as: Dirigible Balloons, Theory of Aviation, Design and Construction of the Charles of Aerophanes, Military Uses 18, 1000 of Aerophanes, 1000 of Aerophane Building and Flying an Aeroplane, etc. This is an extremely popular publication. Price \$4.00, post paid.

PROPERTIES OF AEROFOILS AND AERODY-NAMIC BODIES, by Arthur W. Judge. A technical treatise compiled for use among aeronautical engineers, draughtsmen and students. This is fully illustrated and contains many valuable tables. It is in-tended to form a companion volume to the author's "Design of Aeroplanes." Price \$6.30, post paid.



Vol. 9, No. 22

AUGUST 11, 1919

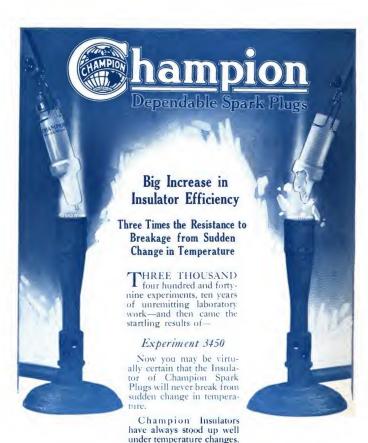
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A Remarkable View of the Glenn L. Martin Bomber Passing the Washington Monument in the National Capital

Trans-Continental Aerial Mail Proposed

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Ball, Roller, Thrust and Combination Bearings



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VOL. 1X

NEW YORK, AUGUST 11, 1919

NO. 22

TRANS-CONTINENTAL AERIAL MAIL PROPOSED

ONGRESSMAN JULIUS KAHN introduced in the House of Representatives on July 30 a bill for the establishment of aeroplane mail service between New York and San Francisco. The terms of the bill are as follows:

"Re is enacted by the Senate and House of Representatives of the United States of America in Congress assembled, to expend, out of any unappropriated balance of the appropriation 'for inland transportation by railroad routes and aeroplanes,' appropriated by the Act entitled 'An Act making

appropriations for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other pur-poses, approved February 28, 1919, for the purchase of aeroposes, approved February 28, 1919, for the purchase of aero-planes and the operation and maintenance of aeroplane mail service between the cities of New York, State of New York, Ceneral is ambiorized to designate such additional points between said cities as he may deem necessary or advisable for the operation and maintenance of an aeroplane mail service between said additional points, to be included in the service to and between said cities of New York, New York, New Service to and between said cities of New York, New York, New York, and San Francisco, California."

BILL INTRODUCED TO ESTABLISH A DEPARTMENT OF AERONAUTICS

ONGRESSMAN CURRY of California introduced a Bill in the House of Representatives on July 28 which is designed to establish a Department of Aeronautics. The Bill follows:

A Bill to Establish the Department of Aeronautics, and for other Purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be at the seat of government an executive de-partment to be known as the Department of Aeronautics, and partment to be known as the Department of Aeronauties, and a Secretary of Aeronauties, who shall be the head thereof. Aeronauties, who shall be the head thereof. I will be a secretary of the second of the senate, who shall receive a salary of \$12,000 per ansum, and whose term and tenure of office shall be like that of the heads of the other executive departments, and section 1.88 of the Revised Statutes is hereby amended to and section 138 of the Revised Statutes is nectory alreaded to include such department, and the provisions of title 4 of the Revised Statutes, including all amendments thereto, and hereby, made applicable to said department.

The said Secretary shall cause a seal of office to be made for the said Department of Aeronautics of such device as the President shall approve, and judicial notice shall be taken of

the said seal.

Sec. 2. That there shall be in said Department of Aeronautics an Assistant Secretary of Aeronautics, to be appointed by the President, by and with the advice and consent of the Senate, who shall receive a salary of \$5,000 per annum. He shall perform such duties as shall be prescribed by the Secretary or required by law. There shall also be one assistant and chief clerk and a dishuring clerk, and such other clerical and chief clerk and a dishuring clerk, and such other clerical assistants as may be required from time to time and authorized by the Secretary. Until such time as an Auditor for

the Department of Aeronautics may be authorized by law the Auditor for the War Department shall receive and examine Auditor for the War Department shall receive and examine all accounts of salaries and incidental expenses of the office of the Secretary of Aeronautics, and of all divisions and offices under his direction, and certify the balances arising thereon to the Division of Bookkeeping and Accounting of the Treasury Department, and send forthwith a copy of each

the Ireasury Department, and send forthwith a copy of each certificate to the Secretary of Aeronautics.

Care J. That it shall be the province and the property of the Secretary of personnel and equipment for aerial mail routes, the preparation of aerial photographs, and the granting of aviators' aration of actian protographs, and the granting of aviators and aeronauts' licenses to civilian pilots, and the promulga-tion of rules and regulations to govern such aviators and aeronauts; the supervision and establishment of aerial land-ing fields, including the supervision of those used for coming fields, including the supervision of those used for com-mercial purposes; the furnishing of personnel and equipment for coast, border, and forest reserve patrol, the instruction, training, and equipming of air forces for the national defense, training, and equipming of air forces for the national defense, tical material, and fostering such development for commer-cial purposes; to establish and maintain an aeronautical academy and such aircraft factories as may be hereafter au-thorized by Jaw; and to this end it shall be vested with thorized by Jaw; and to this end it shall be vested with purishedition and control of departments, bureaus, offices, and heaches of the public service hereinalters georfield, and with such other powers and duties as may be prescribed by law: Provided, That the Secretary of Aeronautics shall submit to the Congress not later than six months after the passage of

this Act detailed estimates for the establishment of an aeronautical academy for the training of cadets in the science of aeronautics, who shall be commissioned in the regular air force when graduated, and for the establishment of such aircraft factories as may be required for the manufacture of aeronautical equipment and material.

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Sec. 4. That all unexpended appropriations which shall be SEC. 4. That an unexpended appropriations which shall be available at the time when this Act takes effect in relation to the various offices, bureaus, divisions, and other branches of the public service, which shall by this Act be transferred to or included in the Department of Aeronautics, or which may hereafter, in accordance with the provisions of this Act. be so transferred and such proportionate part of any unex-pended balances of appropriations as the War Department War Department and the Navy Department would have been required to expend for the pay and allowances on account of officers, en-listed men, and civilian employees transferred to the Department of Aeronanties by this Aet, including medical attendance, transportation, housing, subsistence, clothing, and any other titems not specially set aside for aviation purposes shall become available, from the time of such transfer, for expeuditure in and by the Department of Aeronautics and shall be treated the same as though said branches of the public sertreated the same as though said branches of the public ser-vice had been directly named in the laws making such appro-value of the property of the said department. The the direction of the Secretary of the said department. The Secretary of War, the Secretary of the Navy, and the Post-master General shall, and are hereby directed, by order in writing, to transfer and deliver to such agents of the Depart-tment of the said of the said of the said of the said of the writing, to transfer and deliver to such agents of the Department of Aeronautics as the secretary thereof may designate, all aircraft, including airships, hydroplanes, hydroaeroplanes, seaplanes, balloons, and any other means of transportation, including ships, vessels, boats, and automobiles or other motor including ships, vessets, losats, and automobiles or orner motor vehicles, now in use or on hand, and all material and parts, and all machinery, appliances, and equipment held for use for the maintenance thereof, all lands, docks, wharves, buildings, repair shops, warchouses, and all other property heretofore used by the Department of War, Department of the Navy, and Postoffice Department in, or in connection with, the operation, maintenance, and manufacture of aircraft, or procured and now held for such use by or under the jurisdiction and control of these departments.

That the following named offices, bureaus, divisions, and branches of the public service, now and heretofore under the jurisdiction of the War, Navy, and Postoffice Departthe jurisdiction of the war, Navy, and Postomic Depart-ments, and all that portains to the same, known as the Avia-tion Section of the Signal Corps, the Division of Military Aeronautics, the Bureau of Aircraft Production, the Air Ser-vice of the Army, the Motor Transport Corps, the Naval Hying Corps, the Marine Corps Flying Corps, and the Aerial Mail Service, and any and all other branches of the public service which has been heretofore charged with matters pertaining to aviation be, and the same are hereby, transferred from the Wac, Navy, and Postoffice Departments to the Department of Aeronautics, and the same shall hereafter re main under the jurisdiction and supervision of the last-named department and the Secretary of Aeronautics is hereby given the power and authority to rearrange the work of the offices, bureaus, and divisions confided to such departments, and to consolidate any of the offices, bureaus, and divisions transferred to said department. The official records and papers now on file in and pertaining exclusively to any bureau, office, department, or branch of the public service in this Act transferred to the Department of Aeronautics, together with the furniture now in use in such bureau, office, department, or

furniture now in use in such bureau, office, department, or branch of the public service, shall be, and are hereby, trans-ferred to the Department of Aeronautics. Srz, 6. That all clerks and employees of the War Depart-ment, the Navy Department, the Postoffice Department, or other bureau, office, department, or branch of the public service engaged or on duty exclusively pertaining to aviation and aeronautics shall be, and are hereby, transferred to the Department of Aeronautics at their present grades and salaries.

Sec. 7. That the air force of the United States shall consist of the Regular Air Force, the Reserve Air Force, the National Guard Air Force, while in the service of the United States, and such other air forces as are now or may here. after be authorized by law.

Sec. 8. That the Regular Air Force of the United States shall consist of such squadrons, groups, wings, or other units designated by the Secretary of Aeronautics, to be known as the Line of the Air Force, an Operations Division, an Administration Division, a Legal Division, an Engineering Diviministration Division, a Legal Division, an Engineering Division, a Supply Division, and a Medical Division, to be known as the Staff of the Air Force, within the limitations of this Act. The Line of the Air Force shall be so trained as to

comprise a combatant force of the United States with a view to operating with the armed land and sea forces of the United States while in actual combat, and such other duties as the Secretary of Aeronautics may prescribe. The President shall be, and is hereby, authorized to assign such units of the Department of Aeronautics as may be necessary for cooperation with the armed land and sea forces of the United States in will the armed laid and sea forces of the United States in time of war or threatened hostilities and during maneuers, target practice, and such other exercises as may be held by those forces: Provided, That in time of war or threatened hostilities, when such units are so assigned, they will be under the command of the designated commander of the land or sea forces, or both, as the case may be.

SEC. 9. That the duties of the Operations Division shall be to prepare plans for the national defense and for the mobil ization of the air forces in time of war, to investigate and report upon all questions affecting the efficiency of the air force and its state of preparation for military or naval opera-tions, to render professional aid and assistance to the Secretions, to render professional and and account that the superior commanders and to act as their agents in informing and coordinating the action of all the different officers who are subject under the terms of this Act to the supervision of the Chief of Operations, and to perform such other aviation duties ttot otherwise assigned by law as may be from time to time prescribed by the President. The Administration Division is charged under the direction of the Secretary of Aeronautic and subject to the supervision of the Chief of Operations in all matters pertaining to the command, discipline, or adminisall matters percanning to the command, discipling, or adminis-tration of the air forces, with the duty of recording, authen-ticating and communicating to troops and individuals in the ir forces all orders, instructions, and regulations issued by the Secretary of Aeronautics through the Chief of Operations, of preparing and distributing commissions, of managing the recruiting service, and publishing and recording such other matters pertaining to aeronautics and the air forces as the Sceretary of Aeronautics may direct.
The Legal Division will be charged, under the direction of

the Secretary of Acronantics, with all legal matters pertaining to the Department of Aeronautics, and will be charged with the care of records, and all general courtsmartial, courts of inquiry, and aeronautical commissions, and of all papers relating to the title of lands under the control of the Department of Aeronautics, except the public buildings and grounds in the District of Columbia. The officers of this division will render opinions upon legal questions when called upon by proper authority.

The Engineering Division is charged, under the direction of the Secretary of Aeronautics, with the selection and de-termining of types and designs of all aircraft equipment and material, including ordnance and communicating equipment and material, and the repair and maintenance thereof it shall operate and maintain such aircraft factories as may be hereafter authorized by law, and such repair and machine shops as may be authorized by the Secretary of Aeronautics; the production, experimentation, and manufacture; the producproduction, expecimentation, and manufacture; the produc-tion, operation, and maintenance of aerial photographic ap-paratus; preparation of aerial photographic maps of the United States and its Territories and its possessions, and in field operations, of aerial maps of the theater of operations neid operations, of aerial maps of the intender of operations and such other aeronautical engineering duties as may be assigned by the Secretary of Aeronautics.

The Supply Division will be charged, inder the direction of the Secretary of Aeronautics, with the duty of providing

transportation, clothing and equipage, and barracks, storehouse, hangars, and other huildings; constructing and repairing landing fields and roads; the building, chartering, and operation of ships, boats, docks, and wharves needed for aeronautical purposes; supplying subsistence and articles for sale and issue to those entitled thereto; supplying, distributing. and accounting for funds for the payment of the Air Forces. and such other financial duties as arc specially assigned to it; and attending to all other matters connected with supply and accounting which are not expressly assigned to some other division of the Department of Aeronautics.

The Medical Division is charged with the duty of the care of sick and wounded, making physical examinations of officers and enlisted men, the management and control of hospitals, and furnishing all medical and hospital supplies; with the duty of maintaining sanitary conditions for the Department of

Sec. 10. The President is hereby authorized to appoint and commission in the Regular Air Force, by and with the advice and consent of the Senate, such officers as are herein-after authorized: Provided. That the commissioned strength of the Regular Air Force shall consist of one major general who shall be Chief of Operations, and, under the direction of (Continued on page 1021)



THE NEWS OF THE WEEK



Roland Rohlfs Climbs to 30,700 Feet in Curtiss Triplane

An altitude of 30,700 feet was reached by Roland Robifs, chief test pilot for the Curtiss Engineering Corporation, accord-Curtiss Engineering Corporation, according to his barograph, in a flight from Roosevelt Field on July 31. He started the flight at 2:33 P. M. and landed at 5:32 P. M.

5:32 P. M.

The best previous American record was that of Major R. W. Schroeder, U. S. A., who attained an altitude of 28:000 feet in a British-built Bristol machine, Sept. 18, last year. The world's record is claimed in behalf of Adjutant Casale, a French man, who was reported last month to have reached a height of 33,136 feet.

Adjutant Casale's record has not been 'homologated,'' or registered as official by the air societies of the world, although it may be received later. After the flight of Rohlfs the barograph was signed by the official witnesses and sent to the Aero Club of America to be corrected and authenticated. It may stand as the official

world's altitude record.

Rohlfs flew a Curtiss Wasp triplane KOBITS HEW A CURTES WASP TEPHANE equipped with a twelve-cylinder 400-horsepower Kirkman motor. This machine is known as Type 18-T Triplane, described in the March 31 issue of Aerial. Age. He tried out the climbing powers of the machine on July 25 in an unofficial flight, in which he reported reaching a height of 31,000 feet. Numerous wit-nesses were called to make the flight ofnesses were caned to make the ingin of-ficial, and the barograph was signed by Major J. E. Roessel, Major H. F. Miller, Lieutenant Colonel W. L. Moose, Jr., Cap-tain A. F. Simonin, Colonel Archie Miller, Augustus Post, on behalf of the Aero Club of America; John T. Tarbox, secre-tary of the Aero Club of America, and the pilot himself.

The barograph record will be exhaust-The barograph record will be exhaustively examined by air experts and mathematicians, to fix the official figures of the height. It was said that study of the record might result in placing the exact abittude achieved anywhere between 30,400 and 31,000 feet.

In one of its early tests it hung up a new record for speed-160 miles per hour. new record for speed—160 miles per hour, and upon another occasion it broke the climbing record by attaining a height of 16,000 feet in ten minutes. It has a wing span of 32 feet ½ inch and a total supporting surface of 300 square feet. Its overall dimensions are: Width, 32 feet; length, 23 feet 3 inches; height, 9 feet 10½ inches. The machine weight, empt, approximately 1,800 pounds and carries a approximately 1,800 pounds and carries a useful load of approximately 1,000 pounds. Its minimum speed is 58 miles per hour and its maximum range at eco-nomical speed is about 550 miles. The fuselage is streamlined throughout, presenting an almost continuous contour.

It is equipped with one of the new Cur-tiss twelve 400 horsepower motors, a comtiss twelve 400 horsepower motors, a con-plete description of which appeared in the February 3 issue of Aerlal, Agr. This is a twelve-cylinder motor with a gasoline consumption of 0.55 pounds per brake horsepower and an oil consumption of 0.03 nounds per brake horsepower. The 0.03 pounds per brake horsepower. weight without oil or water is 720 pounds

—almost one-quarter less than any other 400 horsepower motor. It has a 4½-inch flight 58 gallons of gasoline and 6 gallons of oil were used.



Roland Rohlfs, chief test pilot for the Curtiss Engineering Corporation, at the start of the flight in which he reached an ellitude of 30,700 feet

Spad Flies 259 Miles in 110 Minutes Mount Clemens, Mich,-Major Reed Chambers made a fast flight from Dayton Spad, Model 13. The distance of 259 miles was covered in 110 minutes at an average of 141 miles an hour. Prize for Around-the-World Flight

Hoquam, Wash.-Deeds to 1,000 acres of Gray's Harbor land, lying within what it has been hoped for years will prove an oil belt, are to be placed in a local bank as oil belt, are to be placed in a local bank as a reward for the aviator who first en-circles the globe. George J. Hibbard, a Seattle attorney, makes the offer, and has set the time limit for winning the land at August 1, 1920.

Thomas-Morse Biplane in 35-Mile Glide

Ithaca, N. Y .- On August 2, accomplishing the longest glide on record, "Rex" Marshall attained an altitude of 17,000 feet, shut off the engine of his Thomas-Morse machine at the northern end of Cayuga Lake and glided thirty-five miles to this city, renewing his power at an alti-tude of 6,000 feet. Twenty-two miles is said to be the former record.

Supercharger Sets High Altitude Speed Record

Dayton, Ohio,-Major R. W. Schroeder, army aviator, on August 2, set a new world's record for high altitudes, it is claimed, when he flew at a rate of 137 miles an hour at a height of 18.400 feet. He used a two-seated Lepere biplane, de-signed by Captain Lepere of the French army. It was equipped with a twelvearmy. It was equipped with a twelve-cylinder Liberty motor and a super-charger. Lieutenant G. W. Elfey, expert aeronautic observer, was a passenger.
According to Captain B, G. Patterson,

this development will have a marked effect on aerial navigation, because it will enable a pilot to fly at full speed and full power above the storm zone. It will also be potent in trans-oceanic flights and be potent in trans-oceanic flights and would make easy non-stop trips between New York and Chicago, regardless of weather conditions.

The supercharger is an attachment con-sisting of a gas urbine and centrifuga-compressor, deriving its power from the



The Curtiss "Wasp" Biplane with which Roland Rholfs established a new official World's Allitude Record of 30,700 feet. Machine has a span of 32 feet, is 23 feet iong, and weighs 1900 liba. The engine is a Curtiss "12" reted et 400 H. P.

of altitude.

red-hot exhaust gases of the motor. feeds the compressed air into the carburetor at the same pressure as at sea level, so there is no lack of oxygen regardless

Hydro-Aeroplane Saves Drowning

Patchogue, L. I.-W. D. Walton, who has been piloting a hydro-aeroplane in this vicinity, took part in the first hydro-While aeroplane rescue since the war. While tuning up his plane for a flight his attention was called to a group struggling about an unturned boat, just discernable in the waters of the bay.

in the waters or the bay.
Half an hour later, Mr. Walton returned with two dripping passengers, Miss
Grace Flaherty of Laurel Hill, N. J., and
H. V. Fajans of New York. A sailboat
following behind bore a third moistened
person, J. Stuart Blackton, Jr., son of the
New York yaethsman and motion picture producer.

110 Minute Flight from Washington to New York

Washington, - Washington . to York by aeroplane in less than two hours was reported to the Air Service on July 29. Pilot Lieutenant Patrick H. Logan, with a passenger, Major William Conant, covered the 200 miles to Hazelhurst Field. L. I., in 110 minutes, averaging approxi-mately 110 miles an hour.

Among the reports from various air stations received is one from Park Field, Tenn., showing a speed of 120 miles an hour, or two miles a minute for a distance of 160 miles. Pilot Lieutenant J. S. Marriott made the flight in a De Haviland four, carrying a passenger from Park Field to Jackson, Tenn., and return.

Passport Required for Flights to Cuba

Washington, D. C.—Passports are re-quired for flights to foreign countries from American territory, as for instance, between the United States and Cuba. Sec-tion G. O. No. 76, W. D., Jan. 26, 1917, has been modified to include transportation to foreign countries by aeroplane as LePere Makes Record Flight in Florida well as ships.

Pasadena Establishes Municipal Landing Field

Pasadena, Cal.—Pasadena has estab-lished a municipal landing field near the Altadena Country Club covering sixty acres. It has all the equipment of a first-class landing field,

Yakima, Washington, H. Landing Field Has Up-to-Date

Spokane, Wash.—The civilian aviators of Yakima, Wash., have added that city to the list of cities which have up to date aeroplane landing grounds. The Commercial Club obtained permission to use the acreage belonging to the Northern the acreage belonging to the Northern Pacific near the city limits as a site. The field will be properly marked and im-proved. Ernest Schneider, owner of a plane at Vakima, says he will erect a hangar on it. The club is to pay \$10 yearly rental and the taxes for the use of the place.

Lieut. R. P. Parshall, Yakima aviator, is planning a flight around Mount Adams. is planning a linguar around Mount Adams, the will carry as a passenger on the flight, which is under the auspices of the Com-mercial Club, C. E. Rusk, who has fre-quently climbed the mountain and been a leader in efforts to have it made a part of the proposed Vakima national park. Mr. Rusk is to be given an opportunity to take the first pictures from a plane of the mountain. The trip will require two days, one heing taken in a preliminary flight to Glenwood.

Seeks to Prevent Flights Over Ranch Kansas City.-Whether a property owner is also owner of the air above his land is to be determined through a court action brought by Frederick Hoenemann, a farm-er. He seeks to restrain a company owning aeroplanes from using the air above his farm.

Hoenemann contends that the sight of the machines and the noise of their engine disturb the livestock.

In a LePere, flying at an altitude of 6,000 feet, Lieutenant J. D. Corkille, with Sergeant J. R. Cook, made a flight from Arcadia to Daytona Beach on August 1, a distance of 186 miles, in 75 minutes,

a distance of 180 miles, in 75 minutes, rate 1488 miles per hour. Lieuténant R. H. Smith, pilot in a De-Haviland 4, made a flight from Arcadia to Jacksonville, 265 miles, in 127 minutes, at an elevation of 5,000 feet. A new record for Florida. Passengers: Lieutenants W. L. Williams and R. J. Johnson.

Air Service Congratulates Wright

Washington, D. C.—The following tele-gram was sent by the Air Service to Or-ville Wright on July 30:

"The congratulations of the Air Service are extended to you on the tenth anniversary of the delivery of the first aeroplane to the Government of the United States, first in the world to acquire a dynamic air craft. The Air Service appreciates to the full the ever increasing debt owed by mankind to the Wright Brothers, whose foresight, indefatigable research and practicable application have aided the world progress through the invention of a new means of communica-

It will be recalled that ten years ago, on the 30th of July, the United States ac-quired the first aeroplane. This Government was the first in the world to be the possessor of an aeroplane, but had, how-ever, no pilots. Later in the season the ever, no pilots. Later in the season the following American Army officers were taught to fly by Wilbur Wright: 1st Lieut. Frank P. Lahm, now Colonel, and 1st Lieut. B. D. Foulois, now Brigadier-General

On July 30, 1909, Orville Wright and B D. Foulois together made the second and final flight with the Wright machine contracted for by the Government the year before. This was a cross-country trip of five miles in each direction with and against the wind. The speed made was 42 miles an hour. On July 27 the endur-ance test of one hour was made in a flight which totaled 72 minutes, with 1st Lieut. Frank P. Lahm. Lieut. Lahm has the distinction of being the first Ameri-man Armw. differs to five. tracted for by the Government the year can Army officer to fly.

While the Wright Brothers were negotiating in foreign countries for the sale thating in toreign countries for the safe of patent rights, they were communicated with by the United States Government, and in the winter of 1907 the Chief Signal Officer, General James Allen, advertised for bids for an aeroplane. Of 22 hids three were accepted. The Wright Brothers were the only ones to deliver a machine. In September, 1908, official demonstrating flights were begun at Fort Myer, near Washington, in the fulfillment of the contract, but the death of 1st Lieut. Thos. E. Selfridge, nasenger, and the accident to Orville Wright, the pilot of the machine, postponed flights until 1909. Lieut. Selfridge was the first man in the world to be killed by a power-driven aeroplane.

The contract price of the machine was \$25,000. The maximum speed demanded second. The maximum speed demanded was 40 miles an hour, with a bonus of 10 per cent for each mile per hour in addition. The Wrights received \$30,000 for a speed of 42 miles per hour. This was paid out of the funds of the Board of Ordnance and Fortification.



From left to right: A. L. Allan, Curties pilot; E. L. Ovington, President of the Curties Flying Station, Atlantic City, and N. B. Strallon, N. W. Moore, J. W. Forse, Vice-Fresident, Treasurer and Secretary of the Curties Aeroplane and Motor Co., respectively, al Atlantic City Flying State.



TRADE REVIEW



Travellers Company Starts New York-Atlantic City Air Transport Service

An air line carrying passengers between New York and Atlantic City, the first of its kind in this country, was inaugurated on July 25 at 11 A. M., when a flying boat with glassed-in body left the Hudson River at Ninety-sixth Street, on the 105-mile trip down the Jersey coast.

mile trip gown the Jerrey coast.

The flying boats are operated by the The Myng boats are operated by the young aviators who spent several hundred hours in the air in the British or American air service. The "limousine" flying boats are of 150 horse-power, have a speed of 75 miles an hour and can carry two or three passengers besides the pilot. Bookings will be made from the Walden Sengers will go to the Hudson Kiver by automobile from the holden Kiver by automobile from the holden Kiver by automobile from the holden Kiver by automobile from the holdes. The fare is \$100 each way, and passengers are allowed

automotive from the notes. The late is allowed thirty-five pounds of biggages. The seaplane, according to the prepared schedule, will leave New York at 11 A. M. and service in Atlantic City at 2 P. M. and the Hudson should be reached by 4.30 P. M. and the Hudson should be reached by 4.30 P. M. and the Hudson should be reached by 4.30 P. M. and the Hudson should be reached by 4.30 and the hudson should be reached the search and the search

Zenith Increases Capitalization

Detroit, Mich.—The Zenith Carburetor Co. of Detroit has increased its capitalization from \$40,000 to \$\$20,000, of which \$180,000 has been taken up by its present stockholders. The balance will not be issued at present. The real estate, buildings and other assets owned by the French corporation of the Zenith Company will be purchased with the new money.

Aircraft Materials Opens Chicago Branch

New York, N. Y.—The Aircraft Material and Equipment Corporation of New York has opened a branch office in Chicago in the Westminster Building. An additional branch will be opened in San Francisco, it was announced by M. W. Hanks, president of the corporation. The company carries spares for Canadian training planes.

Electric Tools for the Aircraft Industry

Baltimore, Md.—The Black & Decker Mig. Co. of this city have prepared a handsome and comprehensive catalog describing their line. One electric driving their line of electric driving their line cools are of the well-known standard quality of this company, and are of interest to the aircraft indistry in connection with construction and repair of motors and maintenance of tire pressure.

Air Service to Sell Unserviceable Planes for Instruction Purposes

Washington, D. C.—According to an announcement from the office of the Director of the Air Service, the Air Service has an accumulation of miscellaneous aeroplane motors and unserviceable aeroplanes, which were used for instruction

purposes at the various training camps and schools. It has been decided to offer these motors and aeroplanes to all colleges and schools desiring to teach aeronautical engineering, and prices have been fixed commensurate with their value for this purpose.

Although the motors are unserviceable for flying, all moving parts are complete. The prices range from \$250 for Liberty and Hispano-Suiza engines to \$75 for Lawrence engines. Le khone, Hall Scott, Mercedes, Thomas-Morse, Gnome, Renault, Clerget, and Sturtevant engines are

ault, Clerget, and Sturrevant engines are included in the sale. Glenn Martin R, Standard J-I, De Haviland and Thomas-Morse aeroplanes, without motors and instruments and unserviceable for flying are being sold for

Pan-American Aircraft Co. Carrying Passengers in Pennsylvania

Norristown, Pa.—The Pan-American Aircraft Co. of this city is now carrying on a passenger carrying and exhibition business in Pennsylvania. Their present equipment consists of several Curtiss blanch an officer in the infantry, is president of the company. Mr. Alfred Wainwright, was in charge of machinegun assembly for the Air Service during under the company, Mr. Howard R. Watt, was officer in charge of salvage at the aviation repair base at Dallas, Texas. Mr. Harry L. Brownbeck, chief engineer, in several capacities, including that of special representative of the Bureau in a tour finspection of European arreaft fac-

The company had definite plans for expansion and will undertake the construction of aircraft in the near future.

Largest Shipment of Commercial Planes Made to New York

The largest commercial shipment of acroplanes are received in New York arrived recently when a trainload of machines reached here from Taylor Field, Montgomety, Ala, for the Curtis Acropation of the Curtis Acropation of the Acropation of the Curtis Company of the Acropation of the Curtis Acropation of the Curtis Acropation of the Curtis Acropation of the Curtis Company has disappeared in Acropation of the Curtis Company has disappeared in Acropation of the Curtis Curtis Company has disappeared in Acropation in various parts of the United Curtis Company has disappeared in the Curtis Company has disappeared in Acropation in various parts of the United States. The Curtis Company is establishing service stations at all of the Burgaria Curtis has been supported in the States. The Curtis Company is establishing service stations at all of the Burgaria Curtis has been used to the Curtis Curtis Company is establishing service stations at all of the Burgaria Curtis has been used to the State State Curtis Company is establishing service stations at all of the Burgaria Curtis has been used to the Curtis Curti

overhauled and tested before it is allowed to be delivered to the customer.

British Aircraft Lines to Be Sold in U. S.

About 8,000,000 yards of the 43,000,000yard purchase of aircraft linem which Leonard J. Martin recently made of the British Government will be sold in the United States to large and small purchasers. No effort is to be made to dye or bleach the material.

Canadian Firm Develops New Alloy

Montreal, Canada,—The Shawinigan Flectro-Metals Co. of Montreal is said to have developed a new magnesium alloy particularly adapted to aircraft use. It is stated that the new product has but two-thirds the weight of aluminum and is as strong as steel. It is particularly satishable and connection rods of aircraft motors.

South America Purchasing Curtiss Planes

The first foreign shipment of aeroplanes since the war was made recently when the Curtiss Aeroplane and Motor Corporation sent two land machines of the JN type and one water machine of the Seagull three-passenger type to Rio de Janeiro. The shipment was made on the steamer Saint Bede of the Lamport and Holt line

and Hoft line.

It is the advance guard of the mission which the Curtiss Company is sending to South America for the purpose of demonstrating American-made aeroplanes to the Latin-American governments, corpo-

rations and people.

Orton W., Hoover, one of the first and best-known pilots in the United States, left at the same time to set up the machines and to demonstrate them.

Another shipment will be made on the steamer Frankmere of the same line, to Beunos Ayres, in a few days. This will consist of four JN's and one Seaguil.

common Ayres, in a tew days. This will consist of four JN's and one Seagull.

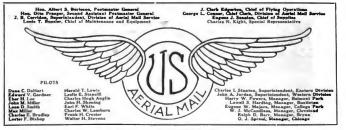
C. W. Webster, South American sales representative of the Curtiss Company, will sail on August 23 on the steamer Vasari. taking with him two three-passenger Oriole land machines, the first purely commercial plane developed.

Lawrence Leon, another well-known pilot who trained many army fliers during the war, is already at Buenos Ayres.

the war, is already at Buenos Ayres. Headquarters will be established at Rio de Janeiro and Buenos Ayres at first, but the mission plans to give demonstrations in all of the South American countries. James Honor and Roy Schneider, two Curtiss mechanicians, are accompanying

the party.

The Bolivian government has already received a Curriss Wasp—the type of machine in which Roland Rollst, Curriss test pilot, recently established a new American to the control of the recently established a new American distribution of the recently established as the recently established as the recently established as the recently established as two-place fighting machine and has a speed record of 160 miles and hour ten minutes. It is exceptionally adapted to work in high altitudes.



New Schedule for New York-Washington Aerial Mail

Through an arragnement made between the Air Mail Service, Postmaster Chance of Washington and Postmaster Patten of New York, a change has been made in the air mail schedule between New York and Washington by which the mail from New York and New England will reach Washington delivery; and the mail from Washington delivery; and the mail from Washington and southern connections to New York will reach that city around 1 o'clock.

will reach that GLV atomotive leave. New York are are many and the reaching to the state of the reaching to a state of the reaching to the state of the reaching to the state of the middle that the pastolike too late for the midnight train for Washington and all New England mail reaching New York between indingibit and 8 A. M. will be carried by aeroplane to Washington.

The mail acroplane will leave Washington at 10 A. M. carrying Washington City mail and mail brought in by the Attention of the reaching that the reaching the reachin

The mail aerollane will leave Washington at 10 A. M. carrying Washington City mail and mail brought in by the Atlantic Coast Line and Scaloard Air Line and their connections from the South, the mail reaching New York about 1 o'clock for middle afternoon delivery.

The aeroplane [left New York on, the

The aeroplane left New York on the morning of July 30, under the new schedule at 8:45 with between 12,000 and 13,000 letters from New York and New England, arriving in Washington at 10:55 A. M. and wee have distributed by 11:30 A. M.

arriving in Washington at 10:55 A. M. and was being distributed by 11:30 A. M. distributed by 11:30 A. M. distributed by 11:30 A. M. distributed by 12:30 A. M. distributed by 13:40 A. distributed by 13:40 A. distributed by 14:40 A. distributed by

Alaska-Seattle Mail Route

From present indications it appears practically certain that the next eighteen months will see the establishment of the Anska-Scattle Arrial Mail Service. The Post Office Department has promised the office appropriation bill expressly states that money appropriated may be used for office appropriation bill expressly states that money appropriated may be used for the joint efforts of W. E. Boeing and E. N. Gott of the Boeing Aeroplane Comments. The control of the property of



Air Mail Pilot E. Hamilton Lee served as stunt flying instructor during war

could be obtained at present, and a general resume of all foreseen contingencies.

Livis dossible that this agree may be obtained this coming year, if a large amount of embusism should be made manifest by the people of Alaska to the Post Office Department, Chambers of commerce in Alaska cities and business firms having an interest in the advancement of commercial relations in Alaska first part of the property of t

As the time required to make the trip scaphare is adaylight trip against four days by setamer, the possibilities of a comvice are also very great. Such an opportunity will be quickly seized. An aerial service to Alsaka can be maintained for at least eight months without interruption, and for the remaining four months, with certain delays due to weather conditions, the contract of the contract of

at present on the Paris-London route.

Thus, enthusiasm is all that is needed to start the Alaska-Seattle Aerial Mail Service.

Superintendent Appointed for Aerial Mail Station at San Francisco

San Francisco, Cal.—According to a statement appearing in the San Francisco Bulletin, an aerial mail service between New York and San Francisco will be in operation at no distant date.

A regularly established aerial mail service between San Francisco and Los Angeles and San Francisco and Seattle in the immediate future is assured.

An aerial mail service station, with hangars, supply, repair and machine shops, will be established and maintained in San Francisco.

In charge of the maintenance and operation of the Aerial Mail Service of the United States, already appointed to the position, will be a San Francisco man, Edward McGrath, chairman of the Postal Censorship Committee in New York during the war, just prior to which he was Assistant Superintendent of Railway Mails in Boston, and for many years was Superintendent of Railway Mails in Soat of the Mail Mail Service Mail Serv

Francisco.

Aero Mail Pilots Receive Increase

Washington, D. C.—One of the terms of settlement of the aerial mail pilots' strike was an increase of pay by the granting of \$3 per day allowance while aviators are on duty away from home. The terms of settlement are reported

to be as follows:

1. The pilots who were summarily dismissed because they refused to make an

ascent in the face of dangerous weather were upheld, when the situation was made

clear. One was reinstated.

2. The orders applying to airmal flights were amended, giving to the district manager or superintendent the say whether the conditions were right for flying, instead of ordering flights from

Washington without knowledge of exact local conditions.

3. The pilots, whose salaries now run from \$2,000 to \$3,600 a year for their hazardous work, get a raise in salary, or rather an extra allowance of \$3 a day

while they are away from home.

1500 American Logion Posts Already Organised

According to a recent statement, already more than 1,500 posts of the American Legion have been organized. New York state leads with 150 posts. All men who between April 7, 1917, and November 11, 1918, are eligible to membership, unless they were conscientious objectors. National Confession of the C

THE IMBER SELF-SEALING GASOLINE TANK

By GEORGE F. McLAUGHLIN, A. M. E.

MUREROUS attempts have been made to perfect a gasoline tank which would be proof against leading in the event of being punctured distribution of the proof against the proof of the faulties could be directly attributed to the fact that the feel tanks were a source of danger. Mr. Jack chimber of a source of danger. Mr. Jack chimber of

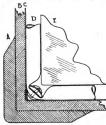


Figure 1

Detail of a corner of the Imber Self-Scaling Gasoline Tank. A—Rubber reinforcing: B—Rubber copering: C—Outer shell or cooling

London. England, undertook to study the requirements of a self-sealing tank and his researches led to some remarkable discoveries.

A small bullet can inflict extensive damage when passing through a gasoline tank. In many cases it is found that an ordinary bullet will tear a hole six or

eight inches in diameter in the side of the tank opposite to that through which the bullet enters. This phenomenon perplexed most of the inventors who were seeking a remedy to keep the gasoline of the devices failed for either they were too heavy or some important detail of the structure was not properly disposed because of an unfamiliarity with the such circumstances, in a tank under such circumstances, and a tank under

such circumstances.

Before going on wiemed by Mr. Imbier

Before going on wiemed by Mr. Imbier

it might be well to present the theories

upon which the invention is based. A

bullet entering the fuel tank makes an

aperture as large in diameter as the

saperture as large in diameter as the

season of the control of the control

is easily sealed by the rubber covering,

no emerging, however, a relatively large

hole is torn in the metal. Investiga
tion showed that the larger hole was

constituted that the larger hole was

against the far side of the tank. Upon

metring the tank the progress of the

bullet is somewhat arrested by the li
bullet is somewhat arrested by the li
min program in the sub
min of the

It was readily seen that the pressure generated in the tank would either have to be confined or released. Many inventors sought to confine the pressure but results showed that when the builet made its exit the pressure sought exit through the aperature made by the builet and in its effort to escape an enormous rupture is made in the tank.

Having acquired a knowledge of the

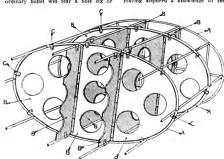


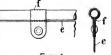
Figure 2

Diagrammatic sketch showing port of the lacer framework of an imber tank for the R. E. is accordance. One end elliptical framework is not shown in the drawing

action taking place in a gasoline tank when it is pierced Mr. Imbre was in a position to seek a means of perfecting a tank to such a degree that not only would in prevent leaking when pierced but he liquid in the event of a bad crash. Tanks which had a small measure of success in stopping simple gasoline leakages under the place of the place



Method of crossing the tubuter members of the limber tank fromework and of securing



to secure haffle plates to the inne

present designers of commercial aircraft for it is well known that many crashes that in themselves do not result seriously are disastrous only because the tank was not constructed to withstand the strain of a damaging impact, with the result that fire follows.

on Trebuilt, that, the clint of the control of the

When the Imber tank made its appearance some experimenters suggested the use of angular section braces for framework and diaphram or haffle plate supports. Failtier research does not be to contain the second of t

Description of the Tank

The Imber tank is composed of three parts. The inside tubular aluminum irranework (D-Figure 1) to which sheet caluminum lanfle plates (E-Figure 1) are attached. The irranework is adapted to attached. The irranework is adapted to the shell. The second part of the tank consists of a metal shell (C-Figure 1) into which the baffle plate frame is inserted. The third part of the tank conjusted to the shell. The part of the tank conjusted in the shell. The resilient or elastic covering returns to its seating against the framework in such a brief space of time to ignite in the event of the projectule being of an incendiary nature.

The tank is installed in the aeroplane

The tank is installed in the aeroplane by means of a cradle, in such a way that no rivets, bolts, etc., are used to secure it to the machine.

Framework and Baffles

The general arrangement of the internal cradle or framework and baffle plates is shown in Figure 2. The diagram shows an oval tank, but of course the principle is applicable to tanks of any

shape or any size.

The framework is built up of aluminum tubing about 5/16" in diameter and 22

gage in thickness. The diameter and gage of material varies according to the size of the tank. Where the tubes cross one another they are held together by rivels as shown in Figure 3, or they may

Figure 5

A sweated or welded joint on the Imber tank

be welded together. Baffle plates are secured to the framework by means of aluminum clips as shown in Figure 4. In this figure, "e" shows the baffle plate and "f" shows the clip.

The entire framework together with

The entire tramework together with the baffle plates is constructed so that no rivets or other means are used to hold it in place in the shell. It is imperative that the inner crafle be not fixed in any way to the metal chall.

in any way to the metal shell.

The function of the framework is to form a backing against which the rubber covering may seat itself to form a self sealing covering.

Shell

The shell or casing is made of tinned steel. Other materials including copper were found to be inferior in some respects to the metal finally adopted. Tanks with a capacity of more than 38 gallons are made of number 28 gage timed steel. Joints are formed as indicated in Figures 1 and 5. The joint is sweather, welded, or otherwise formed without the necessity for the employment of rives or other members passing through the metal.

Covering

The outer covering is of specially prepared rubber which is put over the entire surface of the tank. The rubber is approximately ½0 ain into in bickness. Edges of the tank are reinforced with an additional rubber strip ½ inch thick vulcanized to the covering rubber. The entire tank is then vulcanized for about 75 minutes under a steam pressure of about 40 pounds per square inch.

Specifications require that the rubber covering shall fit closely to the metal shell of the tank but that after vulcanization there shall be no adhesion between the rubber and metal. Adhesion is prevented by chalking the adjacent surfaces of the metal and rubber before the vulcanizing processes.

Rubber is composed as follows:

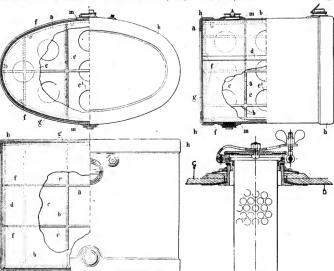


Figure 6

End and side elevations and plan of the Imbedganh. Views are shown held in action. a Peripheral members conforming to the shape of finished tonk; he Members welded is one another to form a complete confirmation. It is a support of the state of the stat

1011

This is cured to the degree which re-sults in the vulcanized covering satisfying the tests mentioned below. As a trial-

30 minutes rising to 40 pounds steam

65 to 75 minutes at 40 pounds steam pressure.

The quality of smoked sheet or other raw rubber is such that not more than six parts per cent of organic matter and sulphur can be extracted from the finally vulcanized product after boiling it in a finely ground condition for eight hours a six per cent solution of alcoholic potash.

The raw rubber compound is calendered into sheets and built up to the required thicknesses by doubling upon a calender. All traces of air are excluded from between various lavers.

The vulcanized India rubber is equally and eventy cured throughout and under microscopic examination, is of homo-geneous character, free from air holes, porosity and all other imperfections.

Where a sticking solution is used it consists of a solution in coal tar naphtha with the addition of a further four per cent weight of sulphur.

Method of Covering Tanks

In order to prevent blistering during vulcanization provision is made for the dispersal of any air which may be en-trapped accidentally between the rubber sheet and the metal tank.

Note: A satisfactory method is to affix a series of strings or fabric tapes around the outer surfaces of the meial tank, with the ends of all strings or tapes projecting at the opening in the rubber cover at the fuel filling aperture. Extending not less than one inch beyond each line of the bevel and at least equal to half the thickness of the rubber which it covers.

Where distortion of the tank is found to occur, owing to shrinkage of the rubber curing cure, the compound sheet is shrunk, before building on to the tank, by immersion in

1—Boiling water, or 2—Steam at 1 to 5 pounds pressure. The treatment should not continue for

more than ten minutes. When the compound sheet is shrunk before building on the tank, all adhering surfaces of seams and joints are rough ened and given a sticking coat of the vulcanizing solution before being joined.

The covering is so devised that a minimum number of rubber joints is made.
Where ends are joined by bevel joints the length of the bevel is at least one

inch and the joint is strengthened by a super-imposed strap of rubber.

L'ulcanization

The rubber covering is vulcanized in position on the tank by steam heat and either the "open-cure" or "wrapped" processes is used. The complete rubber cov-ering is vulcanized in one operation.

When the "wrapped" process is ployed great care is taken that the binding is so adjusted as to prevent distortion of the metal tank, and thinning of the rubber cover at points of extra pressure.

During vulcanization the apertures of the tank are left open to permit free entry and circulation of the steam and to equalize the pressure inside and outside

the tank.

Upon completion of vulcanization all joints and seams are firm, homogeneous, free from blisters and loose edges and resist stripping by hand.

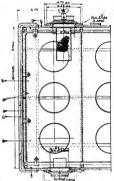


Figure 7

Figure 1
Side section of ane half of the limber tank for
the R. E. 8 aeroplans. The cradle comprise
as A, two of which are breach by herisontal
and varical tubing. The beffin plates [8] are
each other by verdinary rivertice joints. The
beffing effect obtained is thus identical with
that of a tander R. E. 8 med in that with judwhere attached to the tank linking (D). G indicates the outer rubber covering

With each group of tanks vulcanized a test piece is given treatment at the same time. This sample is prepared from the batch of rubber compound sheet which is

used to cover the tanks.

1. Where an "open cure" is employed the piece of compound sheet is 0.25 inches thick and at least 8 inches square.

the piece of compound sheet is 0.25 inches thick and at least 8 inches square.

2. Where the "wrapped" process is used, the compound is made up on a mandril in the form of a tube having a wall thickness of 0.25°, a length of 8 inches and an internal diameter of at least 23%, vrapped before vulcanization

in the same way as the tank.

The sample is vulcanized in the same and the same time as the India rubber covering upon the tank and it is marked with an identification number corresponding with that upon the tank which it represents.

I. For chemical tests the combined Sulphur by difference of the sample should be between 3% and 4.5%

2. A piece of sheet of 0.25" x 0.5 x 1" immersed in gasoline at a temperature of 15.5°C., for a period of five minutes should increase in volume within a minimum of 8% and a maximum of 12%

For physical tests a rectangular piece vulcanized sheet 0.25" thick and 0.5" ide is stretched to three fimes its original length for 24 hours and it should regain within six hours after release its original length within plus 2.75 per cent.

Final Test

After vulcanization and completion of the covering, an internal pressure of one

pound per square inch is applied to the finished tank; at the end of a period of 15 minutes there should be no indication of leakage as measured by loss of pres-

In order to provide for the greater security of the tank against leakage, all fittings are provided with double seatings so that in the event of one joint giving away there will still be a second joint to prevent leakage.

to prevent leakage.

In one convenient form of fitting the desired effect is obtained by having a flange internally threaded bush sweated upon the inside of the casing and surrounding the aperature for the fitting. Into this is screwed a second bush or sleeve carrying the fitting which makes with the first mentioned member a joint with the first mentioned memoer a joint by means of fibre or packing. This sec-ond bush or sleeve projects beyond the rubber covering of the tank and is sur-rounded by a metal washer which is forced into close contact with the exterior of such covering by means of a flange upon such sleeve so as to form a second joint or seating for the fitting, The inner bush is so constructed and arranged that it is practically flush with the inner surface of the metal shell.

the inner surface of the metal shell.

No part of the fitting is allowed to
project iuto the tank in a manner which
would prevent the cradle from being
slipped into the tank.

A specially designed filler cap is provided, as shown in one of the diagrams of Figure 6. The cap is held securely of Figure 0. The cap is held securely in place by means of a single wing nut and flat spring. The arrangement has been found to be very simple in operation for there are no parts to become detached and it is easily manipulated by inexperienced mechanics, without danger of damaging the tank.

The diagram shows the outer flange or collar in position before being screwed down. By screwing down the collar the down. By screwing about the counter edges of the washer press into the rubber reinforcing strip, making the joint tight and leak proof. In the diagram, tight and leak proof. In the diagram, G shows the rubber covering, and E, the metal shell.

Retention of Fuel in a Crash

Besides eliminating leakages due to bullet holes, the Imber tank is able to retain its liquid when subjected to a severe blow from the exterior. Minor shocks are, of course, taken care of by the rubber covering, but when a hard blow is struck the internal construction gives. While the framework is strong enough to give adequate bracing to the tank under ordinary usages, it is pur-posely made collapsible upon the application of a blow likely to cause a punc-ture. In the case of a landing in which a smash occurs, the rubber covering retains the gasoline no matter how badly the tank may have been battered. While the framework of an aircraft may crumple and strike forcefully against the tank or the tank strike the ground, the result will merely be a distortion of the shape of the tank, thereby minimizing the danger of fire from the inflammable liquid that otherwise would have been sprayed about the wreckage.

A feature making the use of the Imber tank unlimited in its application is the fact that it can be made of any shape or size and not only is it suitable for use on aeroplanes and dirigibles, but it is also of great value for storage purposes on the ground.

THE ZEITLIN AERO ENGINE

W. E have just secured the details concerning the design and consequence of the control of an interesting new across the control of the contr

engine.

The new engine resembles certain other aero engines in so far as it is of the four-point of difference consists in this, that the piston stroke is not of uniform length in each of the four movements constituting a complete cycle. What happens in the of 181 mm. can best be explained by means of the simple diagram given in Fig. 3. After the downward working stroke of 181 mm, the piston executes an extra 22.5 mm. of movement brings the top of the piston almost up against the face of the cylinder head, and very thoroughly clears out the products of communication of the control of the control of the cylinder head, and very thoroughly clears out the products of communication of the cylinder head, and very thoroughly clears out the products of communication of the cylinder head, and very thoroughly clears out the products of communication of the cylinder head. The succeeding downward suction of the cylinder head, The succeeding downward suction of the cylinder head. The succeeding downward suction of the cylinder head, the cylinder head is to the cylinder wall near its foot, and, as a result, explosive mixture passes from a result, explosive mixture passes from

the crank case into the cylinder interior. During the suction stroke the exhaust valve is held open for some distance A, so that a suitable proportion of air for the combustion of the explosive mixture may be drawn into the cylinder. The succeeding compression stroke of 203.5 mm. stops about 25 mm. or so from the cylinder head, so as to shord a proper amount of compression space, and leave the piston of compression space, and leave the piston, in working stroke. The working stroke, it will be gathered, stops short just before the inlet port B would be uncovered. It will be seen then that the piston, in It will be seen then that the piston, in

It will be seen then that the piston, in addition to its ordinary reciprocation through 181 mm., performs a harmonic motion through a range of 225 mm. This result is achieved by coupling the consecting rod not straight on to the crait of the consecting rod not straight on to the crait of the consecting rod not straight on to the crait of the consecution of the crait pin, and by driving this bush round the crait pin as axis, in the same direction as the engine and at one-half, the engine seed at

engine and at one-half the engine speed. The crank throw is 101.75 mranagement gives the required most not the piston, gives the required most not the piston, gives the required most not the piston, and the piston of assistance. For simplicity we have here represented the idea applied to an ordinary fixed-cylinder, rotating-crank shaft engine. At the commencement of the working stroke, the crank is at OA and the center of the eccentric at B, the centric fixed rigidly to the crank pin then at the end of the working stroke its center would be on the line CD. As It is, during the half revolution of the crank pin then at the end of the working stroke its center would be on the line CD. As It is, during the half revolution of the crank.

In Fig. 4 it is to be noted we have shown the eccentric as rotating in the opposite direction to the erank shaft. So far as the mere motion of the piston is concerned an exactly similar result is obshaft in the same direction, as will be made clear by a study of Fig. 5. Let us consider the difference between these two consider the difference between these two arrangements as applied in a rotary en-gine of Mr. Zeitlin's actual type. In Figs. 6 and 7 we illustrate diagrammati-cally what occurs between the eccentric and the connecting-rod big end during the and the connecting-fool big end during the working or explosion stroke when respectively the eccentric is made to rotate oppositely to and in the same direction as the cylinders. In Fig. 6, A is supposed to be the crank, B the eccentric, and C the connecting-rod. When the piston is at its inner dead center let us mark the ecceninner dead center let us mark the eccen-tric at D and the connecting-rod bush at E. Imagine for the moment that the cecentric is fixed rigidly to the erank pin, and that the engine is turned through half a revolution. The point D remains sta-tionary at F, but the point E moves round to G through the arc F H G. The design of the engine, however, requires that the eccentric when the piston is at its outer dead centre should be in the position shown in the third sketch. In other shown in the third sketch. In ourse, words, the eccentric has to be rotated on the crank pin, so that the point D may move from J to K. This is achieved by turning the eccentric clockwise through a right angle. The total relative movement between the eccentric and the connecting-rod bush is thus the arc K J L.

In the alternative arrangement illustrated in Fig. 7, the motion of the point E is as before through the are F H (5. But this time the motion of the point D is anti-clockwise from J to K. Thus the transport of the point D is anti-clockwise from J to K. Thus the transport of the motion of the point D is anti-clockwise from J to K. Thus the transport of the point D is anti-clockwise from J to K. Thus the transport of the point of th

In the earlier arrangement the bush A. Fig. 8, surrounding the crank pin and carrying the eccentrics was rotated by a

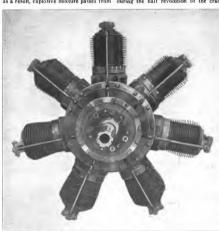
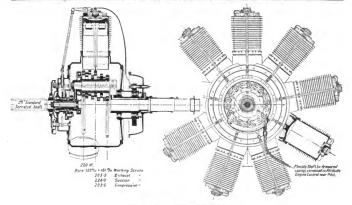


Figure 1
The Zeitlin Aero Engine



PR. S-NINE-CYLINDER 700 HORSE-POWER ENGINE

pair of gear wheels B C, the first fixed to the bush, and the second journalled on the crank shaft, but fixed to and rotating with the crank case. In the later arrangement the obvious method of driving the bush D is to employ two wheels E F con-nected by an idler G to give the required reversal of direction of rotation. It was found difficult, however, to get a three-wheeled 2-to-1 reduction train into the space available, and for this and other reasons Mr. Zeitlin evolved the patented system shown diagrammatically in Fig. 9. system shown diagrammatically in Fig. 9. In this system two wheels A B of a 2-to-1 ratio are arranged inside an internally geared ring C. The wheel B is united to the crank pin sleeve D which carries the eccentrics. The spindle of the wheel A is fixed to the rotating crank case E in line with the extension piece F. carrying the propeller hub. The ring C is mounted on balls within a flanged disc G. This disc forms one web of the crank. It is bolted to the crank pin and at H provides one of the journals whereon the crank case rotates. The journal H is bored to receive the spindle of the wheel A. It will be seen that the sleeve D is thus driven in the same direction as the crank case rotates in, and that, in fact, the ring C is exactly equivalent to the idler pinion shown in Fig. 8.

There is another substantial advantage,

besides that of reduced wear, involved in driving the eccentrics and the cylinders in the same rather than in opposite directions. This advantage is concerned with the nature of the stresses thrown upon the teeth of the gearing driving the ecelaborate demonstration, we can only say that with the earlier arrangement the bending stress on the teeth of the wheel is reversed once every half revolution, the average reverse stress being practi-cally equal to the average direct stress. With the later arrangement this serious practical disadvantage is avoided. Turning now to the general drawing, it

will be understood that the side-by-side disposition of the nine eccentrics on the crank pin requires the nine cylinders to be correspondingly staggered round the crank case. It seems hardly possible to combine the Zeitlin eccentric crank arrangement with the co-planar cylinder disposition found in the master connectdisposition found in the master connecting-rod and other types of rotary aero
motors. Nevertheless, Mr. Zeitlin has
succeeded in placing the cylinders in such
a way that lack of balance arising from
their being staggered has been eliminated.
Starting with the left-hand eccentric as
No. 1, the eccentrics are associated with
the cylinders in the following order:—
Eccentric, No. 1 2 3 4 5 6 7 8 9, Eccentric, No. 1 2 3 4 5 6 7 8 Cylinder, No. 1 8 3 6 5 4 7 2 The order of firing in the cylinders follows the sequence usual in rotary aero engines, namely, 1, 3, 5, 7, 9, 2, 4, 6, 8.

Suction Compression



Fig. 3-LENGTHS OF STROKES

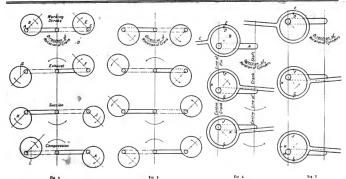
The form of the central exhaust valve should be noted. It is in the nature of a ring which closes and opens an annu-lar port in the cylinder head. The sparking plug is disposed at the center of the ing into the annular port round the inner outer circumferences of the valve shall not cause any deposit in the neighborhood of the sparking plug. In our presence one of the cylinders of the first engine was removed after a run. It was found that whilst the cylinder head beyond the larger radius of the exhaust valve was coated with oil, the surface within the ring was clean.

The electrical connection between the

sparking plug and the distributing ring is a flat strip of stream-lined duralumin is a flat strip of stream-lined unaturaling formed with an eye at one end to clip on to a button at the top of the spark-ing plug. The other end of this lead is fixed to the distributing ring by means of a stud and spring washer, constituting a self-tightening connection. The obing a sen-rightening connection. The co-ject of these details is to permit the ready removal of the cylinder in the least possible time. To effect this removal, the duralumin lead is first pressed slightly towards the cylinder until its eye is re-leased from the plug button. It is then pushed backward—into the plane of the paper, as it were, in the general arrange-ment drawing-so as to clear the cylinder. It now remains only to free the large nut that holds the cylinder within the screwed gland in the crank case. With this nut released, the whole cylinder can be lifted away, for, as usual, the valve rod and tappet rod are not mechanically con-. It will be noticed that the cylinder body is made in two parts, the inner part, the cylinder proper, being a separ-ate entity from the outer part, carrying the radiating fins. The latter part is

made in aluminium.

The method of operating the exhaust valves, and the altitude control associated with it, is one of the most interesting

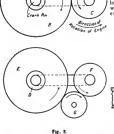


features of the engine. Fig. 10 indicates air drawn into the cylinder decreases, for in diagram form the essential ideas in-although the induction volume remains volved. The inner exhaust valves are constant the density of the air falls off operated by three cams A, B, C, formed with the altitude. In Mr. Zeitlin's engine on a sleeve which is extended to provide the distance A—Fig. 3—is such that the ain internally geared wheel 1). The cam weight of air drawn into the cylinder at member rotates on the sleeve of a gear 12/00 ft. altitude, together with that ob-

air drawn this the cylinder decreases, for constant the density of the air falls off with the altitude. In Mr. Zeitlin's engine the distance, A—Fig. 3—is such that the distance, A—Fig. 3—is such that the distance, A—Fig. 3—is such that properties of the distance of the

the compression stroke, so that the excess air may be expelled from the cylinder before it has time to mix thoroughly with the explosive vapor. The length of time during which the exhaust valve is held open on the compression stroke can be regulated to suit the altitude. In this way, if the regulation is properly give the same power at all altitudes from the ground up to 12,000 feet. The mechanical means whereby the exhaust valve is held open during a variable portion of the compression stroke are indicated in the sketch, Fig. 10. The tappet 6, it will be seen.

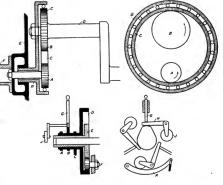
(Continue of the proposed between (Continued on page 1027)



wheel E fixed on the end of the crank shaft, and meshing with the internal gear wheel D through an idler pinion F pinied on the crank case. The cam member is thus driven at half the engine speed in the same direction as that in which the cylinders rotate.

cylinders rotate.

Associated with this drive of the cam
member there is an altitude controlling
arrangement. In an ordinary aero engine
the power developed falls off as the height
of the aerophane increases, because (1)
the percentage of oxygen in a given
weight of air decreases as the altitude
increases, and because (2) the "eight of



Figs. 9 and 10

PRELIMINARY NAVAL FLIGHT INSTRUCTION

By NICHOLAS S. SCHLOEDER

ONSIDERING the general information available on the ONSIDERING the general information available on the art of flying, it is astonishing to find so large a number of students who approach this active work with more or less inaccurate and false preconceived notions of the subject. This is due partly to the many absurd notions of flying ject. This is due partly to the many absurd notions of flying emertained by the layman, relicted in newspaper accounts of accidents, where one reads that 'he was descending in spiral, when his engine stopped, and he crashed to earth,' or that not clear the obstruction, crashing, etc." However, as stu-dents have already undertaken a theoretical survey of the sub-ject, they know better than this; yet, unless care is taken, beginners often derive many contined ideas. All the second

ject, they know better than the period of the separate of the succinctly enough, and their loose generalities often seem to

Contradict previous study, with resultant contusion.

Another type of preconceived notion is in the psychological aspect of flying. Many students approach actual flying with aspect of flying. Many students approach actual flying with much misgiving and doubt as to their ability to learn. Dispell it at once. There is no such creature as the "hirdman" or the "flying type," about whom once much was heard. While fliers differ in skill and, more often, in daring, any normal person can learn to fly well. Those who can't are very rare person can learn to fly well. Those who can't are very rare indeed. Physical deficiencies and nervousness are non necessarily deterrents. Since the days of Herbert Latham and Chas. K. Hamilton, down to the late Guynemer, even consumptives have become skilled pilots. Hence, students should not take flying too seriously. It is as easy and safe as automobiling, if a few simple rules are not disregarded. Bear in mind, no ne ever "geets" into a tallspin, side-slip, etc. Through failure to understand or appreciate some fundamental principle, he might "put" himself into one, but it int

accidental.

Another psychological aspect is a fear entertained by some students of their instructor. This should be lamished at outsidents of their instructor. This should be lamished at oosly at times, but this should not be misconarred. Students have enough to think about flight without worrying about their instructor. They should at all times feel free to ask questions about any difficulties which might occur to them. For this reason I have always considered the relation of instructor and student as the one place where a limited amount of comity is permissible.

The First Flight

Though it has been an accepted practice to confine the ini-tial hop to a joyride, it is best to let the student do as much as is reasonably safe after a few minutes in the air. In this as is reasonably safe after a few minutes in the air. In this way, students maintain balance and execute turns almost before they realized themselves in flight. They are thus spared of much time and trouble, for I recall in the gradual system of the maintain the same and trouble, for I recall in the gradual system flippers, turns, glide, etc., was a profile source of concern to me as they occurred, and materially added to the length of instruction. I found a large percentage of students able to maintain themselves reasonably well from the very outset. With a sufficiently clear system of signals, there is no danger of the student "freezing" on the controls.

Signate For the student to take control, I signal by holding up my right hand with thumb pointed backward to pupil and shake it several times. Now if he climbs too much, I hold up the control of shake it several times. Now if he climbs too much, I hold up both hands, fingers extended forward, palms down, and by waving fingers signify that pupil should gently push his con-trols forward to depress the nose of machine. If the nose falls too low, I reverse the position of palms, turning them upward and back, and wave fingers to denote that student must gently draw controls to himself. Upon assuming proper climbing angle. I close hands, indicating that the position should be held. If either wing drops, I point hand on offend-ing side extending outward, palms upward, motioning with ing sine extending outward, paims upward, motioning with fingers to lift wing by rasing wheel on that side. (Now, for the pair of the pair of the pair of the pair of the of wheel moves to left; in stick control the stick is moved over to left; hence, this movement is often called "left aile-ron," but this term confuses the student and should be avoided.) When more right rudder is desired; that is, when



Nicholas S. Schloeder, formerly Flight Instruction Officer, U. S. Naval Air Station, Miami, Florida

student should move rudder bar forward with right foot, I hold up right hand and move it forward several times; similarly, left hand for left rudder. I indicate turn by extending arm and sweeping it to right or left, as the case may be. For extended to indicate proper glide. If the student overcontrols on any of these signals, I repeat the signal and follow by holding up two fingers, denoting 'too much'. In taking controls from student, I touch my helme with index finger and shake one of the student of the student of the owner, and put both hands on cowl in plain sight; if I do not find them there upon turning around, the student will be severely reprimanded. In this way I have effectually prevented 'freezing' on controls. student should move rudder bar forward with right foot, I

Controlling

The average student passes through successive stages in his manner of controlling. The first tendency is to under-control; next overcontrol, and finally he controls in the responsive, quick and gentle manner which characterizes the experienced filer. He usually passes from the first stage after a few hours, but in most cases he does not entirely enter the finished stage until many hours of solo flight are

To guide the student to overcome undercontrolling, it might be stated that the order in which the controls may be used with most freedom without endangering stability are: ailerons, rudder and elevators.

The chief reason for the initial period of under control arises from the sensation of novelty which the beginner arises from the sensation of novelty which the beginner experiences, which places him under a certain tension. This causes him to grip the controls too tightly and hence his movements are stiff. A student must learn to relax himself without delay—as indeed, many accomplish—and should strive to make his movements light and flexible. He need not be afraid to operate the controls, for he can always correct himself if he has made a mistake.

sen in e nas mace a mistaxe.

Soon he begins to overcontrol. At first this is the natural outcome of his initial fault. Later, particularly in his early solo hours, it is due to a tendency to exaggerate the significance of "bumps," etc., which experience in time will overcome. This is easy to understand.

However, it is not so readily appreciated how stiffness in control will lead to overcontrol, so I will give an illustration. Let me assume that a wing is suddenly depressed in flight. A beginner, either because of tension or a still undeveloped "air sense," will be slow to notice this, and makes no move.

Suddenly he recovers himself, and signifies this by imparting a ponderous heave to the wheel. The wing now comes up, but the beginner, with death grip still fastened on the wheel, forgets to neutralize his controls now that their work has been done. So the wing continues upward, depressing the other wing, which soon receives corresponding treatment. Thus he flounders about from side to side, heaving and yanking. An nounders about rrom side to side, neaving and yanking. An experienced flier, on the other hand, meets the same situation like this. He responds at once, as he feels the wing going down, so that he corrects while, and not after, the air current is tending to depress the wing, so that in most cases he effectively prevents this condition at the start. The air current being past, he at once neutralizes his controls. difference between crude and experienced fliers may be sum med up in a general statement which every student should memorize: A beginner is ponderous, jerky and slow in his use of controls; an expert is responsive, quick and gentle. A beginner's controls appear to move but seldom, but through large distances; they should appear to move more often, but only slightly.

A Straight Course

Longitudinal stability is the first consideration in flight. To ascertain the proper flying angle, it was formerly the practice to define a position on a given machine, such as a part of the rocker arms of engine, which the pilot was to "line up with the horizon. This made him depend too much on a mechanical device, which, as in clouds, is sometimes wholly unavailable. A student should learn to guide himself by feeling. Apart from sense of halance, the action of engine serves as a gauge. Thus, if the climbing angle is too high, the engine will habor, causing some wheration, while the K. the engine will abor, active some view of the engine will appear to lose their functions, due to decreased speed and therefore decreased pressure. On the other hand, the engine will race where the climbing angle is too low. Having attained the proper angle, the plot should endeavor to hold it as steadily as possible, to do which he must be flexible and gentle. In rough weather it is only necessary greater speed; the controls should never be jerked forward and back on encountering a "bump." Learn to "ride" adverse currents, never "fight" them with your elevators.

The relation of engine speed to climbing angle must not with the horizon. This made him depend too much on

The relation of engine speed to climbing angle must not be confused with its relation to engine power. In this con-nection it is important to bear in mind that the proper climbing angle is directly proportional to the power generated by the engine. Thus, when an engine is failing, the angle of climb must be reduced at once. Gravity must be called upon to make up for deficiency in motive power to prevent loss of speed. Induced "nosing her down" is the panacea for nearly all ills of an aeroplane. Hence, a student must always be ready to alight, keep a suitable landing place within gliding distance, and keep ever in mind the direction of the wind.

Wind direction is indicated by streaks in the water running parallel to it, which on calm days are often hard to find or almost entirely absent. The waves furnish a less significant indication, as they are often the result of currents. However, they usually run in parallel lines which are crosswise to the wind. Neither of these signs indicate anything more than the line along which the wind is blowing. The correct alternative may be learned by watching smoke, etc., or better, by observing the general direction on leaving the beach and keeping this in mind.

In the maintenance of lateral stability, the function of ailerons considered alone, presents no special difficulty. The student need only act promptly; less movement will then be necessary.

However, the operation of ailerons in conjunction with rudder is perhaps the most important relation in the art of flying. Some confusing and apparent contradictions are pre-

When ailerons are used to raise a wing, and no change in direction of machine is permitted, the rudder must be in-creased on the side which is lifted. Thus, if a pilot flies with treased of the side which is fitted. Thus, I a proof into which the right ving dragging, and he raises it with his ailcrons, the machine will swerve to the left if he does not increase his right rudder, because of torque. (A dragging wing results in a slight side-slip, and has much the same effect as rudder in overcoming the tendency to the left, as this slip, acting on in overcoming the tendency to the left, as this slip, acting on the vertical fail surfaces, swings the tail to the opposite or not support to the proposite of the vertical surfaces, where the strain on the right legs great, by dragging their right wing, thereby relieving the pressure.) In other words, a student who consistently flies with right wing low, does not hold enough right rander; and similarly, too much right rudder if left wing is down.

Yet the use of opposite rudder in raising a wing, particularly those possessing marked dihedrals, is one of the most elementary and universal in the art of flying. The explanation of this seeming contradiction is this: Where opposite rudder is used, a momentary change of direction occurs. As is evident, the wing on the outer side of the turn will have greater speed and therefore lift, thus bringing it up. To prevent a permanent change of direction the rudder must then be brought back. The temporary character of this rudder func-

brought back. The temporary character of this rudder function cannot be too strongly impressed on the student. A further reason for use of opposite rudder results from the student of the

of direction; and also, in conformity with the principle that a lifted right wing demands more compensation for torque, and vice versa. Hence, the great importance of flexibility in rudder action, the absence of which being so largely responsible for the yawing of beginners.

Little further need be said about the use of rudder in straight flying. It is well to call to the attention of students that straight flying. It is well to can to the attention of students said the pressure on the right rudder bar, due to compensation of torque, is sometimes considerable; many are often led to believe that the instructor is executing this pressure, which of course, is not the case. The student must be impressed with the necessity of holding the rudder, for large numbers permit the machine to swerve to the left because of failure to do so. On the other hand, some hold this rudder too steadily, thereby losing the flexibility of rudder action which is so important.

(To be continued)



Four types of flying boots and scaplanes used for naval aviation instruction taking off in formation

1017

A RELIABLE TAUTOMETER FOR TESTING DOPED SURFACES*

By T. W. H. WARD, Managing Director, Titanine, Ltd.

S is well known, aeroplane dope has As is well known, aeropiane dope in the peculiar property, when applied to fabric, of pulling it taut. Bearing to labric, of pulling it taut. Bearing on this property several new words, such as "tauten," tautness," and "tautometer," not appearing, I believe, in any standard dictionary, have had to be coined, but they have the advantage of being readily un-

derstandable. The power of tautening varies with dif-ferent dopes, hence the necessity for the tautometer, which should measure the degree of tautness brought about by the pargree of tautness brought about by the par-ticular dope or covering employed. Until recently the "tautness" was simply more or less guessed, the method usually adopted being merely to tap the doped fabric and to deduce the tautness from the note produced. The higher the note the greater the "tautening" power of the

the greater the "tautening" power of the dope was assumed to be.

The function of a tautometer is to mea-sure the effect of a depressing force, usually exerted by applying a known weight to the center of a known area of

weight to the center of a known area of dopped fabric.

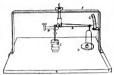
This tautress determination is a measurement of at least two important factors of the dope, i.e. the tension or state of strain given to the dopped fabric and The method of tapping has proved to be both inaccurate and misleading. For instance, a hard film is frequently obtained when an acetyl dope is employed and the doped fabric sounds tauter than measurement with a reflable tautometer frequently indicates a hard and brittle film which will have a great tendency to crack which will have a great tendency to crack on exposure.

There are various types of instruments for example, consists of a heavy round-for measuring "tautness" now in use; one, bottomed framework, having a pivot through the center attached to a spring on the upper side which, in turn, is con-nected with a pointer. Except for a knob fixed to the lower end of the pivot only the outer rim of the round bottom of the instrument touches the doped fabof the instrument touches the doped rap-ric. This instrument is placed on the frame to be measured, and according to the "tautness" of the doped fabric the knob at the end of the pivot is pushed upwards to a greater or less extent, thus compressing the spring and moving the pointer round to a position which may be read off on a circular scale. This instruread on on a circular scale. This instru-ment has many disadvantages, the chief of which is that only the tautness of the small portion of the doped fabric en-closed by the rim of the instrument is measured. Also, the whole weight of the tautometer on the doped fabric, and that favor. One cannot consider this instru-ment at all satisfactory, and yet it has been the one most commonly used for the

purpose.
Unlike other instruments used for measuring tautness, the tautometer used by my firm is based on the principle of a my arm is based on the principle of a balance with a 10 to 1 beam (or any other convenient ratio), so that the deflection of the long arm (Fig. A) may be magnified for a slight depression of the other (B). This beam is suspended on a knife

edge in the ordinary way, except that the support is connected with a screw (E) which is used to adjust the beam to any height required. This screw also serves







ness with of dope

to fix the whole apparatus to a frame-work (F)-which fits over the frame to be measured in such a way that the specified weight (400 grammes having been adopted in the case of the instrument de-scribed) is suspended from the short arm, exactly over the center of the frame. This weight is compensated by a 40-gramme weight (D) in the scale pan, suspended

from the long arm (A).

When this tautometer is placed on when this tautometer is placed on a frame the reading of the pointer, at the end of the long arm, should be at zero on the curved scale (G) attached to the framework at the right hand side. If this is not the case the necessary adjustment may be effected by turning the screw (E) in the direction required either to raise or lower the beam. When this has been done the 40-gramme weight should be removed from the scale pan. This causes the 400-gramme weight (C), which till now has been just touching the surface, to rest on the doped fabric and the depression due to it may be read off by means of the to it may be read on by means of the pointer and scale at the other side. This curved scale may conveniently be divided into divisions representing millimeter (or fraction of an inch) depressions of the 400 gramme weight on the doped fabric. The 10 to 1 beam has the advantage

here of causing quite a perceptible de-flection of the pointer for only 1 m.m. depression of the weight, and it must be understood that the smallest deflections are caused by the tautest frames.

are caused by the tautest trames.

The instrument has been in daily use
by my firm for two years, with extremely
satisfactory results. A simple adaptation
on the same principle has also been used for much larger frames (and might with advantage be employed for aeroplane wings), as follows

In this case all framework is dispensed with, except for the bracket (1) used for supporting the knife edge (2) of the beam (3). This is fixed to the wall at a convenient height and should stand out

half way across the frame (4) (or wing to be measured), so that the weight (5) to be used for determining the tautness may be arranged to touch the center of the frame. The beam, itself, should be counterpoised, as before, so as to give a long arm and a short one, when in equili-brium on the knife edge. Then, as in the previous case, a heavy load is suspended from the short arm to test the tautness of the doped fabric, but, unlike the other tautometer, instead of having the comtautometer, instead of having the com-pensating weight in a scale pan, a sliding weight (6) has been adopted, which is placed directly on the beam. When a reading it taken, one slides the weight rium to another position (8) nearer the knife edge, so calculated as to allow the necessary load to rest on the dopped fabric. The reading of the pointer on the curved scale (9) may then be read off as before, to slive the depression of the doped fab-rity of the state of the principle. The press of the principle.

The great advantage of the principle, described above, is its simplicity, the readings obtained being the direct result of allowing a specific weight to rest on the center of the doped fabric. This is a great improvement compared with other instruments, which, by having their whole weight resting on the surface, both complicate matters and give misleading re-

Book Review

PRACTICAL FLYING, by Flight Comthe first practical work on actual flying the first practical work on actual flying and instruction for the flying services, covering the whole field, from elementary groundwork to advanced flying. It in profusely illustrated with diagrams and detailed drawings; also a complete glosary of flying terms and phrases. It is a volume that has been and is extensively used, and highly recommended by instructors of flying, men who have had much experience along this line. Price

much experience along this line. Frice \$1.65, post pay \$d\$. A. S. Riach. The author deals with the subject of propelers in a most complete and comprehensive manner. This is a more technical treatise on the subject. The theory in this present volume has been assumed to be absolutely correct and results obtained the subject in the property of the pro have been carried to their logical conclusions. It treats of pressure on aerofoils, pitch of an air-screw blade, blade shape and efficiency, blade sections and working formulae, "laying out" the air-screw, stresses in air-screw blades, static thrust, of an air-screw blades, static thrust, or a efficiency of an air-screw at different speeds of translation and direct lifting speeds of translation and direct litting systems, also contains a note on the influence of "aspect ratio" and the effect of the indraught in front of an air-screw. Price \$5.75, post paid.

ARBIAL PROPELLER, prepared by Charles B. Hayward. Design theory of action,

thrust, pitch ratio, and construction of the two-blade propeller are the subjects treated of in this instrucive paper, Price 60c, post paid.

TERMES D'AVIATION, GLOSSARY OF AVIA-TON TERMS ON FRENCH AND ENGLISH. The title alone explains the contents of this valuable publication. Price \$1.10, post paid.

These books can be purchased at The Aeronautic Library, Inc., 299 Madison . Avenue, New York City.

THE WHITE TRANS-PACIFIC MONOPLANE

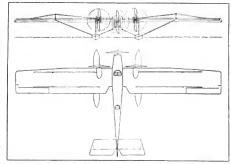
the Los Angeles factory of the George D. White Company the construction of a triple-motored mono-plane is being pushed for the purpose of making a trans-Pacific flight. The White making a trans-racine light. The White monoplane is of the seaplane type, having twin floats, and is the largest monoplane in the world. Full co-operation has already been secured, the route is mapped the flight is scheduled to be made within the coming months. A northern route, as shown on the accompanying map, has been chosen as more suitable at this

Full co-operation along this route is as sured by the Pacific Aero Club, Aerial League of Canada. and by the Governor of Alaska, Hon. Thomas Riggs, Jr., who is preparing arrangements for the stop at Sitka

There seems no objection, according to Mr. Riggs, as the average temperature is from 53 to 60 degrees, which is not severe, despite the rather northern point.

From Los Angeles the first jump will be to San Francisco, a distance of 450 miles, From there to Victoria, B. C., a distance of 750 miles. From Victoria to Sitka, Alaska, is a jump of but 650 miles. From Sitka to Unalaska, on the Aleutian Islands, will be an oversea journey of 1,200 miles. This jump completes prac-The next lap is from Unalaska to Petro-paylovsk, Kamchatka. This is a 1,500-The next lap is from Uniassa to Jero-payloysk, Kamchatka. This is a 1,500-mile flight and one of the longest to be made, as although some of it is within sight of the islands, the greatest part is across the Pacific Ocean. Technically, the trans-Pacific flight would end here, but the machine will make another hop to Yokahama, Japan, another long flight, but one of comparative ease. The final jump will be to Shanhai, the end of the historic 7.000-mile trip.

A route via Hawaii and the South A route via Hawaii and the South Pacific Islands has been suggested, but the White Company has decided that this would be impractical, as stops would have to be made either at the many small islands or a non-stop flight of 3,000 miles would need to be made. Although such a flight is not impossible, still one



Front and plan views of the 860 H.P. three Hispano motored White Monoplane

of that length has never been made, and All surfaces are balanced, making control it would be hazardous to the extreme to

attempt it over unknown waters. The dimensions of the trans-Pacific White monoplane are as follows: watte monoplane are as follows: Wing spread; 82 feet; length overall, 39 feet; height to top of Inselage, 9 feet; weight empty, 3,700 pounds weight with crew and fuel for the Pacific flight, 7,900 pounds. Total horsepower, 660, gener-ated by three Hispano-Shizz amended ated by three Hispano-Sniza engines. Two 180 H.P. engines are located one on Two 189 11.P. engines are tocated one on each wing on each side of the body. The third engine, 300 H.P., is installed in the nose of the fuselage as in single-motored aeroplanes. The wings have a peculiar sweephack, raked tips and an angle of incidence of four degrees. The angles are so worked out that the monoplane has practically inherent and auto-matic laterial and longitudinal stability.

simplified and untiring.

Either the two 180s or the one 300-H.P. engine will be used at one time, but H.P. engine will be used at one time, but all three are not to be used simultaneously. A speed of 110 miles an hour will be given by 300 H.P. By having approximately the same amount of power in reserve as is being used, the possibility of 1886 with 1898 and 1898 and 1898 and 1898 are seen to the same amount of the start, the two 1886 and 1898 are seen are seen and 1898 ter engine in reserve. After running a number of hours the central engine will be switched on and the two smaller en-gines shut off. This method will be fol-lowed throughout the entire flight, which allows the engines to rest, and also allows the engine expert to make an inspection and the necessary minor adjustments; new spark plugs can be installed, carburetor adjustments made, ignition troubles overcome, or other minor requirements which, under ordinary conditions, mean motor failure and an interrupted flight.

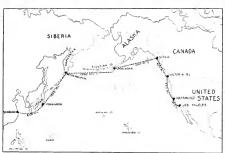
The White truss system is used in the construction of the wings; no wires are used in the construction whatever, and no cables for the controls or other parts.

no cables for the controls or other patts. The fuselage is constructed as a compact unit, with no wires or turnbuckles. The fuselage is built of Haskelite, a strong veneer built up of Oregon spruce and African mahogany, which is cemented together under hydraulic pressure. This together under hydraulic pressure. This gives enormous strength, is water-tight and gives perfect alignment.

The pontoons, two in number, are spaced 15 feet apart, and extend more than half the entire length of the machine. They are constructed of machogany and cedar veneer, and are dinogany and court veneer, and are univided into many compartments, sectioned with bulkheads. Either pontoon is capable of supporting the entire machine.

The principal object in the White Com-

pany's entry to cross the Pacific Ocean is to blaze the way along a practical route that can be followed later in practical service. In view of the fact that great import trade is springing up with the Far



showing proposed route of White Monoplane across the Pacific Ocea



Side view drawing of the White Trans-Pacific Monoplane

East, a quick passage for mail and light express is a necessity, and the route planned is estimated to take three days, compared with three weeks by the fastest hoat.

It has been pointed out that should the rules of the Thomas H. Ince prize bar the machine from participation due to the northern route chosen, the flight will be made in any event. Later it is planned to remodel the monoplane, substituting a landing gear for the floats, and attempt to make a non-stop flight from Los Angeles to Chicago.

HELIUM

I' to the present time all military and most other balloons have been filled with hydrogen. This gas, although giving the greatest lift which it is pos-sible to secure, is so highly inflammable as to make the destruction of balloons by fire, not only in war time, but during operations under ordinary conditions, a serious matter. For example, the writer happens to know personally of twenty-six cases in which kite balloons or dirigibles have been completely destroyed by fire, caused by atmospheric or frictional electricity, during the last two years. Many attempts have been made to minimize this fire hazard by fire-proofing balloon fabrics, and by use of hot air or ammonia in place of hydrogen, but so far without success. The use of helium instead of hydrogen affords absolute safety from fire, whether caused by accidental electric sparks or by incendiary or explosive hullets of an enemy in time of war. An adequate supply of helium will, therefore, entirely revolutionize balloon practices, and will do more than any other one thing to assure to the nation possessing it, that control of the air which will in the future be absolutely necessary for any adequate plan of National Defense.

The history of helium is interesting.

About 70 years ago, a line was discovered in the spectrum of the sun's atmosphere, which could not be identified as belonging to any element known on the earth, This unknown gas was, therefore, named helium. Many years later, a thimble full of a gas, occurring in very minute quan-tities in the earth's atmosphere, was iso-lated by Sir William Ramsay, and proved later in y Sir William Ramsay, and proved to be the hitherto unknown element to which the name helium had been given. It was then proved to be not only incombustible hut inert in every other chemical way and to have about twice the density of hydrogen. Still later it appeared that this gas is formed wheneven radium or any other radio active ma-terial disintegrates and for a time active chief source from which helium was obtained in small quantities for scientific research was certain radio active minerals. Still later helium was found to be a con-Still later nerum was found to be a con-stituent of certain natural gases, particu-larly those occurring in Southern Kansas, parts of Oklahoma and Northern Texas, and processes were developed at the University of Kansas for purifying it so cheaply that it could be sold to scientists. small quantities, at something like \$1700.00 per cubic foot. At that time the total quantity of reasonably pure helium in the world was probably less than 100 cubic feet. In the face of so discouraging an outlook, some one in the British Admiralty had imagination enough to proprose seriously, that helium should be produced in sufficient quantities for the British Balloon Service, and experiments were undertaken in Canada for this purpose. A report on this matter was found in a mess of British documents sent to this country soon after we entered the war, by the Gas Warfare Committee of the Bureau of Mines and the matter was brought to the attention of the Signal Corps and the Burtau of Steam Engineering. Since that time about six millions have been either spent or ohligated, the entire practicability of the production of helium on a large scale at a cost of ten to fifteen cents per cubic foot has been demonstrated, and production plants to yield 40,000 to 60,000 cubic feet per day are now being constructed or under test.

Three processes, alike in fundamental principles, but differing in important de-One of these, the tails, are being tried. Linde process, has demonstrated its success and is the basis of the production plant now being built. The second, the Claude process, gives promise of a some-what lower operating cost than the Linde process, but has not yet been entirely per-fected. At present, this plant is temporarily shut down until the new Government pipe-line can provide it with an adequate supply of undiluted Petrolia gas, at which time the final test will be made. The third process, invented by Norton and developed by the Bureau of Mines, is the basis of the large experimental unit in Plant No. 3. This unit is still being worked into shape hy Norton, the inventor, and it is hoped that satisfactory results will be forthcoming within the next two months. It gives promise of an operating cost lower than either of the others.

amp cost loves thank client of the todays and cost loves thank client of the limb, with the exception of Plant No. 3, has been placed in the hands of the Navy Department by mutual agreement between the Army and Navy. All that it is necessary for the Army to do at the present time, is therether the navy of the limb control of the limb cost loves and the limb cost loves are the limb cost loves and the proper utilization of the helium that will be supplied to it under the agreement with the Navy, and third, to assume the responsibility of providing an after responsibility of providing and resp

It is further suggested that there is much to be done hefore the Army will be ready to use this use gas in the most effective way. A small repurification plant has already been authorized and plans for it are nearly completed. The question of modifying the designs of the various types of ballooms in use, so as to make them appropriate for helium, should be undertaken at once. The chief difficulty is connected with the very large than the control of the contr

Finally, it must be remembered that the upply of helium in the United States, although large, is by no means unlimited. At the present time probably a million cubic feet per day is being fed through the natural gas mains of various cities in the Middle West and being dissipated into the atmosphere through thousands of chimneys. Steps should be taken at the earliest possible moment to secure for the Army and Navy the right to process all supplies of natural gas containing usable quantities of helium before this gas is distributed. The details of such a procedure will require careful study and for this purpose an Argon Conservation Committee consisting of a representative of the Navy, a representative of the Army and a representative of the Bureau of Mines was appointed last August by the Aircraft Board and an adequate allotment to cover its expenses recom-mended. For various reasons effective mended. For various reasons enective action by this Committee has seemed impossible until very recently. It is now lioped that the Committee can proceed with its work in the near future.

Book Review

THE AMBRUSS ARE SERVEY, compiled by Arthur Swetzer, with an introductory chapter written by Newton D. Baker, Sectary of War. This is a story of American military aviation. Every phase of our war program and many facts unknown to the public, such as hitherto unpublished figures, callegrams and other data are included in this valuable historic chunuc, Besimming with the early experi-column, the properties of the properties o

This book may be purchased at The Aeronautical Library, Inc., 299 Madison Avenue, New York City,



NAVAL and MILITARY · AEDONAUTICS ·



4.844 American De Havilands Delivered

to Date Washington, D. C.—The Bureau of Aircraft Production received during the week ended July 15, two De Haviland 4 planes, making a total of 4,844 produced

to date. The table shows deliveries of De Haviland 4 planes (including 204 without en-gines used in A. E. F. as spares) before and after the armistice

no arter the monomer	Deliveries	Per cent of total
efore armistice		71
fter armistice	. 1.413	29

265 Seaplanes to Be Sold By Navy

Washington, Aug. 2 .- Acting Secretary of the Navy Roosevelt anounces that Sec retary Daniels has authorized the sale of 265 seaplanes belonging to the navy. Mr. Roosevelt says that the sale of these machines will give commercial aeroplane transportation companies an opportunity to buy high-speed machines of large carrying capacity ready for immediate de-livery. He says that a number of such routes are already in operation or contemplated in the near future, such as from New York to Atlantic City, San Pedro to Santa Catalina, Key West to Havana, Chicago to Milwaukee and other lake cities, and a projected route to the Bermuda Islands.

The sale will include 83 RS-2 pusher biplanes, each with 330 horsepower Liberty motors; also 72 H-6 and F-5 tractor planes, each with two 330 horsepower Liberty engines.

The Bureau of Supplies and Accounts.

salvage and sale section, will issue com-plete schedules of the sale, giving the characteristics of all the machines to be sold, their location, appraised value, specifications and terms.

Aircraft Appropriation Withdrawals

Washington, D. C.—The unused bal-auce of the appropriation for the fiscal year ending June 30, 1919, as modi-fied by the Third Deficiency Act for the Bureau of Aircraft Production amounts to \$170,743,000 of the \$360,647,000 appropriation, the withdrawals amounting to \$189,904,000. For the Department of Military Aeronautics the appropriation was \$107,469,000, withdrawals \$27,328,000, balance \$80,141,000, according to a statethe General Staff on July 23.

The withdrawals during June for the \$18,626,000 or 9 per cent of the total; the Department of Military Aeronautics withdrew \$1,681,000 during June.

Gale Wrecks Army Bombers Mincola, N. Y.—Five aeroplanes, in-cluding the Martin bomber intended for the one-stop transcontinental flight, the Caproni bomber and a Handley Page bombing plane, were wrecked when a terrific thunderstorm passed over Hazelhurst Field, dismantled buildings and uprooted Field, dismantied buildings and uprooted huge trees. A Caproni triplane, almost completed, was badly damaged by the wind. The damage totals several hundred thousand dollars.

Sales of Surplus Supplies
Washington, D. C.—The Statistics
Branch of the General Staff reports the

sale of the following supplies: Department of Military Aeronautics, week ending July 18, \$801; total to July 18, \$3,497. 324; estimated value of supplies, Jan. 1, 1919, \$85,000,000; estimated cost of material sold, \$21,800,000; per cent of material sold. 26. The figures for the Bureau of Aircraft

The figures for the Bureau of Aircraft Production are: Sales for week ending July 18, \$296,447; total to July 18, \$4,360,-207; estimated value of service January 1, 1919, \$62,000,000; estimated cost of material sold, \$7,600,000; per cent sold, 12.

The unliquidated contracts for the Air

Service represent hut 9 per cent of un-liquidated War Department contracts.

No Reductions in Army Pay Washington, D. C.—Instructions are being sent to the Commanding General of depot, the commanding officer of each camp, post or station and each re-cruiting officer, in effect that newspaper reports that pay of enlisted men will revert after the recent emergency to pre-war scale are incorrect; that the appropriation bill for the fiscal year 1920 provided that provisions of Act approved May 18, 1917, in so far as it increased the pay of enlisted men of the Army, are continued in force and in effect from and after the date of approval of this appropriation act of 1920. It is directed that all concerned give wide publicity to these facts.

Dimensions of Navy Dirigible Hangars

Announced
Washington, D. C.—According to information disclosed by Secretary Daniels rormation disclosed by Secretary Daniels regarding the naval dirigible hangar to be erected at Lakehurst, N. J., it will be 800 feet long, 265 feet wide, and 174 feet high. These are inside dimensions. The great concourse is 760 feet long, 126 feet wide, and 50 feet high.

The outside dimensions of the hangar are even greater. The space actually oc-cupied will be 920 feet long and 352 feet wide, and the structure will be more than 200 feet. The doors, of which there will be four, two at each end, are 129 feet wide and 174 feet high.

The steel tonnage will exceed 6,000 tons, and the cubic contents of the building will be 50,000,000 feet. It will be covred will be \$0,000,000 feet. It will be con-ered with colored, corrugated asbestos, which will make it freproof. A series of windows and skylights on all sides will afford ample light, while there will be numerous staircases and two huge eleva-tors leading to the roof. In the spaces between the great trusses will be placed numerous shops for the use of the avia-

Three railroad tracks will run the length of the hangar. The building will hold one 10,000,000 cubic feet ship and two smaller ones at the side, or two 5,000,-000 cubic feet ships side by side.

Victory Ribbon Bars Buttons and Medals Being Distributed Washington, D. C.—The War Depart-

washington, D. C.—The War Depart-ment announces that the Victory ribbon bar, the Victory button and the Victory Medal are now available for distribution at Army posts, camps and recruiting offices.



The motor truck unit for captive balloons mounts not only the power driven winch, but spare parts, telephone opparatus, scientific instruments, camping paraphernalis, etc.

(Continued from page 1004)

the President, or of the Secretary of Aeronautics under the direction of the President, shall have supervision of all Air Forces of the line and of the staff divisions of the Air Forces hereinbefore mentioned and shall perform such other duties pertaining to aeronautics not otherwise assigned by law, as may be assigned to him by the Secretary of Aeronautics, and ten brigadier generals, ninety-eight colonels, two hundred and five lieutenant colonels, four lundred and fifty majors, seven hundred and eighty-five captains, time hundred and finety first licutemants, one thousand one hundred and forty second lieutenants, who will be commissioned in the line of the Regular Air Force; and one brigadier general, fourteen colonels, twenty-five lieutenant colonels, forty-five majors, eighty captains, who will be commissioned in the Administrative Division of the Regular Air Force; and one brigadier general, seven colonels, ten licutenant colonels, fifteen majors, twenty captains, who will be commissioned in the Legal Division of the Regular Air Force; and one brigadier general, fifteen colonels, twenty-five lieutenant colonels, forty majors, eighty captains, one hundred and twenty first lieutenants, two hundred and thirty second lieutenants, who will be commis-sioned in the Supply Division of the Regular Air Force; and one brigadier general, fourteen colonels, twenty lieutenant colonels, thirty-five majors, seventy captains, one hundred first lieutenants, one hundred and fifty second lieutenants, who will be commissioned in the Engineering Division of the Regular Air Force; and one brigadier general, seven colonels, fifteen lieutenant colonels, twenty majors, sixty-five captains, one hundred and ten first lieutenants, who will be commissioned in the Medical Division of the Regular Air Force; Provided, in the Medical Division of the Regular Air Force: Probleds, That not to exceed two brigadier generals, eight colonels, the Regular Air Force may be detailed in the Operations Division: Proceeded further. That officers holding permanent commissions in the Army, Navy, or Marine Corps, now serving, or who have served, in the Army, Air Service, the Naval ing, or who have served, in the Army Art Service, the Naval Flying Corps, or the Marine Corps Flying Corps between April 6, 1917, and November 11, 1918, and such temporary officers of the Ariny. Navy, and Marine Corps, as hold active commis-sions in the aviation branches thereof at the time of the passage of this Act, shall be eligible for appointment and commission in the Regular Air Force without examination: Promission in the Keguiar Air Force without examination; Pro-vised further, That such emergency officers of the Army, visited further, That such emergency officers of the Army, thirty days on active duty between April 6, 1917, and the passage of this Act, with the Army Air Service, the Naval Fying Corps, or the Marine Corps Flying Corps, shall be eligible for appointment and commission in the Regular Air Force: Provided further, That at least 20 per centum of the grades hereinbefore mentioned, below that of major general and above that of second lieutenant, shall not be filled until six months after the passage of this Act, at which time they sist moments after the passage of this ACI, at which time they are the high properties of the that commissioned officers of the first of the prescribed by the Secretary of Acronautics, and that after one year after the passage of this ACI, promotions shall be governed by the rules of seniority. And that the number of second lientenants hereithelore authorized is hereby increased in the number of six hundred and ninety until such time as promotions to the grades hereinbefore reserved shall reduce the number of second licutenants to one thousand five hunthe number of second neutrants to one trousant are num-fred and twenty: Provided further. That the pay and allow-ances, including increased pay for participating frequently and regularly in aerial flights, shall be the same as that now pro-vided by law for commissioned officers of the Army, including retirement: Provided further, That increased rank will

electricians, expeants (first class), mess sergeants, chauffectus (first class), expeants; chanffuers, corporal, buglers (first class), burglers, privates (first class), and privates, the number of cash grade being fixed by the President from time to time; Previded, That all enlasted men or the Army, Navy, or Marine Corps on advisor duty. It the time of the passage Marine Corps and reculisted in the grade of the Regular Air Force carrying the marest pay to that which they held when discharged; Provided further, That the term of enlistment Previded pather, Iliast the pay and allowances of enlisted men in the Regular Air Force shall be the same as the corresponding grades and ratings of the Regular Army, including the interests. The provided is the property of the property of the therefore and the provided of the property of the property of the property of the provided in the three of the provided price of the property of the property of the property of the provided price of the property of the provided price of the property of the pr

Sec. 13. That the Reserve Air Force of the United States shall consist of an Officers' Reserve, available for service as temporary officers of the Regular Air Force, as officers of the line, and of the various staff divisions provided for in this Act under such rules and regulations as the President may prescribe not inconsistent with the provisions of this Act. The President shall be authorized to appoint and commission are reserve officers in the line and the various staff dissions of the Reserve Air Force in all grades up to and including that of major, such citizen as, upon examination prescribed by the President, shall be found physically, mentally, and morally qualified to hold such commissions: Provided, That the proportion of officers in any section of the Reserve Air Force shall not exceed the proportion for the same grade in the corresponding section of the Regular Air Force, except that the number commissioned in the lowest authorized grade in any section of the Reserve Air Force shall not be limited. in any section of the Reserve Air Force shall not be imited.
All persons now holding commissions in the Aviation Sec-tion Signal Reserve Corps, or in the Aviation Section of the Naval Reserve Force and the Marine Corps Reserve, shall, for a period of three years after the paysage of this Act, be eligible for appointment in the Reserve Air Force in the rank nearest that held in the Army, Navy, or Marine Corps Reserve at the time of the passage of this Act without further ex-amination: Provided, That such of these as hold commissions as colonel or lieutenant colonel may be commissioned in source of the treatment Reserve Air Force shall be in force for a period of five years, unless sooner terminated in the discretion of the President.

SEC. 14. That in time of actual or threatened hortilities, the President may order officers of the Reserve Air Force, subject to such physical examination as he may prescribe, to temporary duty with the Regular Air Force. While such reserve officers are on such service they shall exercise command appropriate to their grades and rank and shall be entitled. Because a such as the corresponding grades and the properties of the corresponding grades are the properties of the corresponding grades and the properties of the corresponding grades to the execution of the properties of their orders, to obey the same, to the extent provided for from time to time hy appropriations for this specific purpose. The Secretary of Aeronauties is authorized to order reserve officers to active duty for instruction for periods not to exceed thirty days in any one struction for periods not to exceed their days in any one the properties of the periods of the periods periods to the periods of the periods periods and the consent of the reserve officers concerned and within the limits of funds available for the purpose, such periods may be extended as the



FOREIGN NEWS



Sir Isanes Describes New Radio Aid to Aeriai Navigation

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First Westward Flight Across South America

First Westward Flight Across South America
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alian colony, f-leut. Locatelli saw service during the war on the Italian front. He look carr in one of the raids over Trieste by Gabriele D'Annungio's

Trans-Mediterranean Flight in 5 Hours 40 Minutes

Paris—Capt. Morchal, an aviator, who tried to fly from France to Russia during the war, but was obliged to land in the Austrian lines of July 19, flew in a bydroacroplane from St. Raphacl, Deartment of Vor, across the Mediterranean to Bizerta, Tunis. Capt. Morchal covered the distance of alount 450 miles in five hours and forty minutes.

Hydrozeraplane to Explore Congo Rivar Valley

Brussel (Correspondence of The Associate Press)—The Belgian Committee of Correspondence of The Associate Press)—The Belgian Committee of the Corpe colony.

Resides mail and passenger transport hydroacroplanes are to undertake an important challenger transport hydroacroplane are to undertake an important challenger transport property of the Committee of the Comm

Aeriai Transport in Hawaii

Honolulu, H. T.—The air service squadron stationed here is now making frequent flights between Hilo on Island Hawaii, outward distance

north of Molekas and Maui 230 miles, and return trip south uf Mau over the Alalakerks Channet, the Auau Channet north of Lanai and south of Molekas, distance 15 miles. instead of going on a small steamer, a journey of two days, a letter was carried for the Governor of the terri-tory by aerophane in two house.

The Farman F-50 Biplane

The F-30 biplane, equipped with twin 223-11. Lerraine engines, is being converted for carrying eight passengers. The only structural work with windows arrounding the entire compartners completely enclosure to with windows surrounding the entire compartners, completely enclosure to with windows surrounding the soft of the surrounding the entire compartners completely enclosure to with windows surrounding the entire the surrounding the entire that the entire t

Caproni Bipiana Carries Fifteen Passengers for 220 Miles

According to information from the Caproni Company, a Caproni pa enger-carrying biplane made a flight from Milan to Turin and back, wit a load of fifteen passengers, in two hours. The distance is 220 miles

Fiat Flies 158 Miles an Hour with Two Passengera

Flying a First BR hiplane, Mr. Brack-Papa established a world's record, on Jine 2.75.

on Jine 2.75.

on Jine 2.75.

inited with two passengers aboutd. The flight was officially controlled and the speed certified by a Commission of the Aero Chub of Islar. This is the highest speed cere statuted in any element; the previous record to the controlled produce of the produce of the controlled produce the controlled produce of the controlled produce of the controlled produce of the controlled produce the controlled produce of the controll

British Ministry of Munitions Work Summarized in Parliament

British Mistary of Monitions Work Summarised in Parliament London, Eng. —f. his speech in the House of Common on June 24 introducing the Ministry of Munitions Vote, Mr., Rellaway and that 100 caresphare. The Ministry heapens reponsible for aeroplane production on September 12, 1917, when the production had necessarily to the Common of the Common haster—production had been increased to 4,000 stagety, engaged on other cacertal war production this country was able, thanks to the improving our for exclusion and the fragilation of the Common of th

Commercial Air Rautes Being Established Throughout Italy

Commercial Air Routes Being Established Throughout texty

(Translated from Nie 6 II Mende, Rome)—In (sale, public and
private energies seem to sure to the question of serial postal service

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age) at Created Arrangements are advancing paging for the pre
tical population of a postal air line including Naples, Palermo, Tunis,

Topol. the there is still much to a



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. MSNahon



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Results of Illinois Model Aero Club's Contests

On July 6th the Illinois Model Aero Club held a hand-On July 6th the Illinois Model Aero Unit held a final-launched and R. O. G. distance contest at Ashburn Flying Field for the Villard Cup and Aerola. Acc prizes. The judges were Messrs. Walter L. Brock, E. M. Lair, and James S. Stephens. The contestants were Messrs. Joseph J. Lucas, William Schwitzer, Ellis C. Cook, Ward Pease, and Robert

All of the models were twin pushers powered with rubber ands. The record of the contests is as follows:

	Hand L	nunched	R. C). G.
Lucas	(1) (2) (3)		(1) (2) (3)	1,248 ft. 1,447 ft. 504 ft.
	Total.	3,739 ft.	Total.	3,199 ft.
	Average	1,246 1/3 ft.	Average	1,033 ft.
Schweitzer	(1)	2,778 ft.	(1)	1,101 ft.
	(2)	1,262 ft.	(2)	1,805 ft.
	(3)	1,329 ft.	(3)	1,006 ft.
	Total,	5,369 ft.	Total.	3,912 ft.
	Average.,	1,789 2/3 ft.	Average.	1,304 ft.
Cook	(1)	1,771 ft.	(1)	1,085 ft.
	(2)	1,709 ft.	(2)	755 ft.
	(3)	1,760 ft.	(3)	705 ft.
	Total,	5,240 ft.	Total.	2,545 ft.
	Average	1,746 2/3 ft.	Average	848 1/3 ft
Pease	$\begin{pmatrix} (1) & \dots & \dots \\ (2) & \dots & \dots \\ (3) & \dots & \dots \end{pmatrix}$	2,410 ft. 1,603 ft. 946 ft.	(1) (2) (3)	452 ft. 710 ft. 703 ft.
	Total.	4,959 ft. 1,653 ft.	Total. Average	1,865 ft. 621 2/3 ft
Jaros	(1)	2,108 ft.	(1)	800 ft.
	(2)	1,799 ft.	(2)	1,273 ft.
	(3)	1,116 ft.	(3)	625 ft.
	Total.	5.023 ft. 1,674 1/3 ft.	Total.	2,698 ft. 899 1/3 ft

Illinois Model Aero Club Meet

By Jos. J. Lucas

The Illinois Model Aero Club held a Gala Day Hydro Meet on July 13th at Lake Calumet. This Hydro Meet was one of the series for the Laird-Weaver Trophy, which is to be awarded to the member making the best showing in all the model meets held for the year. The men who had hydro models were the Messrs. Wricon, Wells, Pond, Jaros, Schweitzer, Lucas, Hittle, and Pease.

Many long duration hydro flights were made and Mr. William Schweitzer made the best average for his three official flights, winning also the special prize offered by Mr. Partridge for the best duration flight, which was 96 seconds.

The next model aeroplane meet of the Illinois Model Club will be held on August 10th for hand-launched duration and many entries are expected.

Scale Model of Curtiss JN 4 B

Mr. Louis E. Heim, of 421 E. 137th Street, Bronx, N. Y., has built a model of a Curtiss JN 4B from a description which appeared in AERIAL AGE. TH

he dimension	ns of	ti	he	m	ю	d	c	1	11	·e	1	a	s	Í	C	ı	k	'n	N	5	:	
Span, upper	wins				٠.																	323/4 in.
Span, lower	wing									٠.												251/2 in.
Chord, both	wing	S		٠.															٠,			334 in.
Overall lens																						
Gap								٠														41/2 in.
Weight																						12 00

The model is fitted with sufficient rubber band motive power to enable it to fly 100 feet or over. There is an eight-cylinder, dummy motor at the head with a radiator attached.

The landing chassis consists of two struts with brass fittings attached with cotter pins, with an axle 1/8" in diameter running through, on which is attached two 2" aluminum disc wheels.

The wings have a dihedral of 34". The struts are fastened by means of brass terminal fittings which are attached to the main beams by means of small screw-eyes which are good supports for the wires.

The rudder is fastened by means of wires running through the fuselage to the cockpit, where they are attached to a stick (similar to stick control). The cockpits are fitted with small windshields made of celluloid, which gives a realistic appearance to the machine.



Club average.



941 4/15 ft.



A Curtise JN 4 B Madel made by Louis E. Heim, from drawings and a description which appeared in Aeriai Aga some time ago



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Military Efficiency

During the war a colone of the cavalry, assigned to take charge of an aviation field, point the first advised the various departments of his new post. Surprised at finding so many broken landing gears in the repair rooms, he inquired the reason and was informed that the cause was bad landings on the part of student avaitors. Forcibly impressed by this apparent waste and determined to eliminate it, he immediately went to headquarters and issued an order that no more bad landings would be tolerated at that field.

The Flying Dutchman: 1919 Version

The soul of a viking wandered down in the wake of a roaring gale

From the frozen bergs in the polar sea that long dead Norsemen sail The crystal fleets from the glaciers launched, that lift their

ghostly spars
In the flicker and flare of the Northern Lights and the gleam
of the cold white stars.
"I want a ship," said the viking's soul, "to speed in the tem-

pest's teeth

When the lash of the wind flails fast and hard the foaming waves beneath. I would feel the thrill that I felt of yore when I sang to the

rhythmic sweeps, And a new shore rose for my conquering from the haze of

unknown deeps.

He came to the wild Newfoundland coast and saw in a lonely place

A strange, long ship that tugged and tore like a stallion keen for a race.
"Now here," he cried, "is a noble craft. Ho! this is the ship

And he leaped aboard the long C-5 and sailed away to

sea Far up in the chill gray fog that hangs and curtains the northern skies,

A rushing form in the Arctic storm, the vagabond airship And the sea king's hand that steered of yore the war boat

out of the fjord Now guides the great dirigible hence where never its kind has soared.

The Flying Dutchman rests below, but the flying blimp will haunt The Banks for many a stormy year the fisherman's heart to

daunt, A shape half seen in the rolling clouds through the scudding mist and rain,

Careening out of the inky void and lost in the murk again. The sailor beating against the wind to the urge of the angry surge Will see from the gloom of a sudden squall a shadow black

emerge And vanish into the seething night, and will bellow, "Look alive!

There goes the wandering navy blimp, the runaway ship C-5." Minna Irving, in the New York Times.



A revised map of the Atlantic-Ket in the Oakland "Tribune



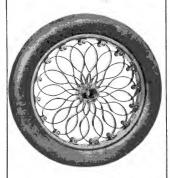
"Skeeter-Time"-Brenstrup in the San Francisco "Chronicle"



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FIRE-AUTOMOBILE-TORNADO-EXPLOSION-RIOT AND CIVIL COMMOTION

(Continued from page 1014)

it and the cam the end of a lever H fixed to a short shaft, which, at its other end, carries an arm provided with a roller J. All the nine rollers are arranged in

J. All the nine rollers are arranged in one plane, and pass in turn over a curved cam surface K provide to a Keed point of the property of the provided to a transfer of the provided to a transfer of the provided to an indicator handle under the pilot's control. At the ground level the cam K is set fully in so that, as each roller than the provided of the cam A. B or C, and the exhaust valve is accordingly held open during a portion of the compression stroke. For sharting purposes the cam end as the decompression gear provided on certain other are one ginner. As the altitude increases the pilot progressively withdraws the cam out of action, so as to the air drawn into it during the suction stroke, until the normal height for which the engine is designed is reached, at which height the cam K is the romains closed throughout the entire compression stroke.

throughout.

It is claimed that the introduction intothe cylinder, during the lirst part of the
suction stroke, of a large volume of air
in advance of the inlet of the combustible mixture from the crank case,
entirely eliminates all possible retention in the cylinder of some the retention in the cylinder of some part of the
hot products from the previous working
stroke. It is further claimed that the

absence of inlet valves conduces to a like result, while being an advanageous mechanical feature for other reasons. Other features of the engine to which special attention is called are the very complete ment of the piston during the exhaust stroke, the central situation of the exbanation, the condition of the condition of the reason of the same size and shape, and the cylinders.

Special Orders Nos. 170 to 175 Inclusive Lieut. Col. John A. Paegelow will proceed to Washiogton, D. C., on temporary duty; thence to Army Balloon School, Lee Hall, Va., and report by letter to the Director of Air Service, Washington, D. C., for duty.

Army Balloon School, Lee Hall, Va., and report by letter to the Director of Air Service, Washington, D. C., for duty.

Lieut. Col. Ralph Royce will report to Fort Sam Houston, Tex., to the commanding general, Southern Department.

First. Lieut. Jesse A. Praether, Air Service, will report to the chairman of the Commission on Training Camp Activities, this city, for duty.

Maj. Archie W. Barry will proceed to San Antono, Tex., and report to person to the commanding officer, Brooks Field, for duty.

First Lieut, Leo. F. Post will proceed to Mather Field, 'Sacramento, Cal.

Second Lieut, John W. Rankin will proceed to the aviation repair depol, Montgomery, Ala.

to the aviation repair depol, Montgomery, Ala.

Capt. Phil A. Henderson will proceed to Fort
Sam Houston, Tex., and report in person to the
Department Air Service Officer, Southern Department, for duty.

Second Lieut. William Slade will proceed to Fort Sheridan, Ill., and report in person to the commanding officer. United States Army General Hospital No. 28, for further observation and treatment.

First Lieut. Bruce Struthers will proceed to Fort Bliss, El Paso, Tex., and report in person to commanding officer for assignment to duty with the 96th Aero Squadron.

Second Lieut. Yancey C. McDaniel will proceed to Petrolia, Tex., and report in person to the department air service officer. Southern Department, for duty as officer in charge of gas plant, No. 3.

Lieut. Col. Barton K. Yount will proceed to March Field, Riverside, Cal., and report by letter to the Director of Air Service, Washington, D. C., for duty.

First Lieut, Edmund T, Allen will report in person to the commanding officer, Langley Field, Hampton, Va., for duty.

Col. Halsey Dunwoody will proceed to Washington, D. C., and report to the Assistant Secretary of War for assignment to duty in his office.

Second Lieut. John Lawson Leonard is transferred to United States Army General Hospita No. 28, Fort Sheridan, Ill., and will report to the commanding officer, that place, for further observation and treatment.

First Lieut, John D. Cox will report in person to the commanding officer Letterman General Hospital, San Francisco, Calif.

Lieut. Col. Benjamin F. Castle is detailed as assistant to the military attaché, Paris, France, and will report to the military attaché, American Embassy, Paris, for assignment to duty.

The following named second lieutenants will proceed to Barron Field, Everman, Tex.: Henry E. Wooldridge, Paul H. Prentiss, William B. Atwell.

Col. Olan C, Aleshire will proceed to Fort Sam Houston, San Antonio, Tex., to the commanding general Southern Department for duty as assistant department Air Service officer.

First Lieut, Robert Furrer Linkenhoker will proceed to Whipple Barracks, Ariz., and report in person to the commanding officer United States Army General Hospital No. 20 for duty.

Maj, Frederic C. Phelps will proceed to Taliaferro Field, Hicks, Tex., and report by letter to the Director of Air Service.

First Lieut, William H. Preece will report in person to the commanding general Camp Lee, Va., for discharge.



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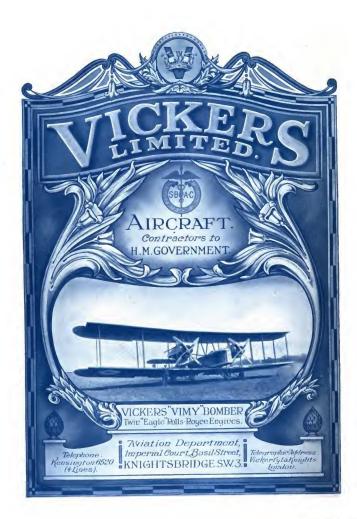
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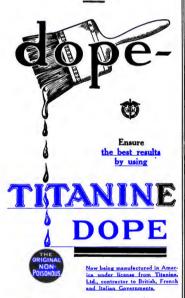
Capt. Charles J. Glidden Offers Glidden Efficiency Trophy

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THE NATIONAL TECHNICAL, ENGINEERING AND TRADE AUTHORITY

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VOL. 1X

NEW YORK, AUGUST 18, 1919

NO. 23

CAPT. CHARLES J. GLIDDEN OFFERS GLIDDEN EFFICIENCY TROPHY

O bring about the use of aeroplanes for touring and general use, Captain Charles J. Glidden, the noted sportsman, who contributed extensively to the development of automobiling by organizing the Glidden Automobile has offered a trophy for aeroplane touring through the Aerial League of America, of which Rear Admiral Peary is presi-

The trophy is to be known as the Glidden Aeroplane Efficiency Trophy, and is to be competed for under the auspices of the Aerial League of America, under rules similar to the rules which governed the automobile tours for the famous Glidden Automobile Trophy.

In making the offer of the Glidden Aeroplane Efficiency Trophy, Captain Glidden wrote to Rear Admiral Peary, the president of the Aerial League of America, expressing his belief of the great future of aviation, as follows:

My dear Admiral Peary:
"I am happy to learn that so many members of the Aerial eague of America are purchasing aeroplanes for sport, League of pleasure and transportation.

"It is indeed most gratifying to find that manufacturers are overwhelmed with orders and cannot produce fast enough to meet the demand.

"The experience of that aeroplane manufacturer who doubled his production three months ago, but is still behind in his deliveries because the orders for aeroplanes have quad-rupled in volume, only gives an idea of what is to come.

The five hundred people who have bought aeroplanes during the past four months and the hundreds who are placing orders and clamor for deliveries are only the vanguard of an army of thousands of people who will own aeroplanes in the

"More people would own aeroplanes now if they could get deliveries, and more if there were more landing fields where they can start from and land their planes.

"We need more landing fields through the country, and the Aerial League of America deserves great credit for its work in getting cities to establish fields.

"Had we flying fields at every twenty or fifty miles from New York to San Francisco, transcontinental flights would be daily occurrences, because we have the aeroplanes that can make the flights, the people interested in making the flights, and aerial travel has many advantages and attractions.

"I believe that our engineers and manufacturers are capable of producing even better aeroplanes than were produced for the war, and that these planes will be produced as soon as something is done to bring out the qualities required in aeroplanes, to be used for pleasure, transportation, and commercial purposes.

"To assist in this constructive work, and believing that aerial tonrs is the lest and quickest way of bringing about the use of aeroplanes for general purposes, and improving the construction of aeroplanes, and cause the establishing of flying fields throughout the country, I will gladly contribute a trophy to be competed for under rules similar to the rules of the Glidden Automobile Trophy."

Captain Glidden's generous offer has been accepted by the Executive Committee of the Aerial League of America, and the rules for the Glidden Aeroplane Efficiency Trophy are being drawn by a committee of which Major Reed G. Landis, second ranking American Aee, is chairman.

Captain Charles J. Glidden, who is the publicity officer, Air Service, United States Army, is about to leave the Army, having requested discharge. He was a pioneer in the auto-mobile field, and as the donor of the Glidden Trophy for automobile neid, and as the donor of the unded i rophy for automobilist he contributed much to the development of the automobile. He was also a pioneer in aeronauties, becoming interested in ballooning twenty years ago. He holds the American, French and British twenty years ago. He holds the American, French and British lealloon pilot certificates, and was one of the founders of the Aero Club of America, in 1905. He entered service at the United States Army Balloon School as an officer, June 12, 1917, at Omaha, Neb, then became department aeronautical officer, Northeastern Department, Boston, Mass, and organized the aeronautical department and secured in two months 2009 applications for halloon pilots and aviators, and when transferred applications were coming in at the rate of forty per day. His transfer was to Omaha, Neb., where he became the president of the Aviation Examining Board. He had twelve states and secured in four months 4,000 applicainto there states and secured in four monitor 5,000 apprica-tions for halloon pilots and aviators, personally passing on mental qualifications of over 2000 men, to Join the service. As personnel adjutant, U. S. Army Balloon School, Fort Omalia, Neb., he had the assigning of men to proper positions and for overseas, and passed on 4,000 men.

Later he was represented of the General Staff at Atlanta, Ga, for seven states to sector staff officers, and at the time the armistice was signed applications were coming in at the rate of fifty a day. He had secured 250 in ten days. He was transferred to the Souther Field, Ga, for administrative work, and at one time held fifteen positions, including personnel adjutant and publicity officer.

In April, 1919, he was placed in charge of the recruiting campaign for the Air Service, and in a short time secured the names of 17,000 persons interested in aviation who were

the names of Lyaov persons interested in aviation who were assisting in obtaining recruits.

He was transferred to Washington and started the Air Service publicity, and issued stencils daily showing activities of the Air Service, as news all over the United States, show-

of the Air Service, as news all over the United States, showing many exceedingly interesting events unknown, such as forest fire patrol, cross-country flying, etc., etc., etc. From May 14 to August 8, 1999, he issued 115 stemcils containing nearly 2,000 items of Air Service activities. In conference with Chief of U. S. Weather Bureau and forecasters he arranged for the adoption by them of a weather forecast for navigators of the air, which is sent to all Air Service stations at 9,30 A.M. and 9,30 P.M. dairy, sevene laws of life and property and considered, thereby sevene laws of life and property and considered, the prosaving loss of life and property and considered one of the most valuable features of the Air Service.

REPORT OF THE AMERICAN AVIATION MISSION ON EUROPEAN TOUR

THE War Department authorizes publication of the fol-lowing statement by the Secretary of War and of the appended report of the American Aviation Mission of which the Assistant Secretary of War, Benedict Crowell, was chairman:

"In making public the report submitted to me by Mr. Crowell and his associates on the American Aviation Mission, I desire to emphasize the thoroughness and value of the studies made in England, France and Italy with regard to the importance of aircraft and the essential dependence of the art for its development upon a sympathetic attitude in the in accord in believing that this new agency of transportation has possibilities upon which it is now quite impossible to set limits. They are further agreed that we face a period, more or less brief, in which the prospect of commercial return is not sufficiently sure to justify private enterprise in develop-

ing the aeroplane industry into a self-sustaining position.

The importance of aircraft as a military arm is obviously so great that we must leave nothing undone both to develop art in its scientific and practical aspects and to provide facilities for rapid quantity production in the event of emer-

gency.
"From these considerations it is clear that the ingenuity and ability of American engineers and inventors must be coordinated and our national effort freed from wastefulness and

suppraction.

The Mission has in my judgment gone too far in suggests. The Mission has in my judgment gone too far in suggests. The Mission has respectable and the properties are specialists in the art, both the aeroplanes and the pilots needed, are of a different type from those needed in our different theory. Mistary pilots are trained to fight singly and different theory. Mistary pilots are trained to fight singly or in formation, and to operate in coordination with other branches of the military service, so that their training must be military. Their own efficiency and that of the other branches of the initiary service, so that one of the other branches of the service depends upon the most intense and constant associated training, and a separation of the Air Service from the Army or the Navy would require coordina-tion of their activities in time of war, whereas effectiveness in military operation rests upon the concentration and singleness of authority, command, and purpose.

"The point emphasized by the Mission is the importance of maintaining adequate production facilities in this country. This it is believed can be brought about best by the establishment of a government agency which will lay down the neces-sary rules, national and international, for aircraft operation, prevent discouraging lack of uniformity in state regulation, and generally stimulate private and public enterprise in per-fecting and using commercially this mode of transportation, iecting and using commercially this mode of transportation, and by centralizing the placing of orders on government account so as to have the incidental effect of making them contribute to the maintenance of aircraft production as an industry. It is not proposed, as I understand it, that great appropriations of public lunds should be made for the establement of the contribution of th lishment of uneconomic commercial air service routes, but obviously an extension of our air mail service could be made, obviously an extension of our air mail service could be maine, and it could be further extended as the perfection of machines advances and their reliability of service is more and more established. Sinch encouragement as the government may find it wise to give can be accomplished without sacrificing the science of military aeronauties. The Joint Boad of the Army and Navy is already eliminating duplication and producing on in developing the air service of those departments, cooperati and should Congress decide to extend its aid to the commercial development of aircraft, complete cooperation will be easy in all matters of invention, design, and production where the different aspects of the problem meet on a common ground. "(Signed) NEWTON D. BAKER,

"Secretary of War."

The full report is as follows: To the Secretary of War.

In accordance with your instructions, the American Avia-tion Mission visited France, Italy and England. It was able to confer with various ministers of these Governments, rank-ing Army and Navy commanders, and the foremost aircraft manufacturers.

A thorough study and investigation was made by your Mission of all forms of organization, production and development. As a result of these studies, your Mission desires to emphasize the universal opinion of its members that immedi-

ate action is necessary to safeguard the air interests of the United States, to preserve for the Government some benefit of the great aviation expenditures made during the period of of the great avanion expenditures made during the period of the war, and to prevent a vitally necessary industry from entirely disappearing. Ninety per cent of the industry created during the war has been liquidated. Unless some definite policy is adipted by the Government, it is inevitable that the remaining 10 per cent will also disappear.

In placing this matter before you the subject falls into

three important heads:

(1) General organization.

(2) Development, commercial. (3) Development, technical.

The findings of the American Aviation Mission and its recommendations are submitted after a careful review of the situation in the allied countries mentioned, but always keeping in mind the situation in the United States. Under the above sub-heads the results of those investigations are pre-sented to vou, which, in the opinion of the Mission, demand the most earnest and immediate consideration along the broadest lines, with a view to establishing some fixed policy which will save the aircraft situation in the United States and give the United States an equal place with the great powers of

Europe in this great new commercial development.

The American Aviation Mission therefore recommends:
The concentration of the air activities of the United States. military, naval and civilian, within the direction of a single Government agency created for the purpose, co-equal in im-portance with the departments of War, Navy and of Commerce, to be called in this report, for purposes of identifica-tion, the National Air Service.

In making the above recommendations, the following views and data of the Mission are presented:
Visits were made by the Mission to England, France, Italy, and conferences have been held with those largely responsible for the successful prosecution of the war, and especially with those men most experienced in the aerial development within those countries. Among others interviews have been had with:

France:

Marechal Foch, Commander-in-Chief des Armees Allices. Mr. Andre Tardieu, Ministre de Affaires Franco Americaines.

General M. Duval, Chef de Service de l'Aeronautique. Mr. Jacques Dumesnil, Depute, formerly Sous-Secretaire de l'Aeronautique.

Mr. Loud eur, l'resident du Conseil de Guerro, now Minister of Reconstruction,

Mr. Daniel Vincent, Depute, ex-Under Secretaire for Avia-

Mr. Gaston Menior, Depute, Chief du Comite Aeronautique au Scnat. Major d Aiguillon, of the Commission Interministerielle de l'Aviation Civile.

Honorable Winston Churchill, M.P., Secretary of State for War and Air. Field Marshal Sir Douglas Haig, Commander-in-Chief of

the British Army,

Admiral Syr David Beatty, R.N., Admiral of the Fleet. Major General Right Hon, J. E. B. Seely, Under Secretary of State for Air, Major General Hugh M. Trenchard, Chief of Air Staff,

Royal Air Force.

Major General Tings as: Trentarin, Cinet of Air Stan,
Royal Air Force.

Major General E. L. Ellington, Director General, Supply
and Research, Royal Air Force.

Major General Sir Frederick H. Sykes, Controller General
Civil Ayustion, Royal Air Force.

Sir W. A. Robinson, Secretary, Air Ministry

Major General Sir W. S. Brancker, Royal Air Force.

Italy:

Signor G. Grassi, Chief of the Italian Aviation Mission in Paris.

Colonel Guidoni, Italian Foreign Aeronautical Mission. Admiral Orsini, Chief of Italian Naval Aviation. Colonel Crocco, Chief of the Technical Bureau. Signor Conti, Secretary of State for Aviation.

In all countries visited, and in the minds of all persons met (Continued on page 1063)



THE NEWS OF THE WEEK



RADE REVIE

75-Minute Flight Between Washington and New York

Washington, D. C.—The air speed rec-ord hetween Washington and New York was broken on August 8 by a De Havi-land plane, piloted by Lieut. Col. H. B. Claggett, commander of the Dallas-Boston fliers, who covered the distance of 210 miles from the Capitol at Washington to the Statue of Liberty in 75 minutes. This was an average speed rate of 168 miles an hour. Sergeant Ralph Kratz was a pas-senger in the plane. The elevation during flight average 4,000 feet.

NC-4's Trip Postponed

Portland, Me.—The exhibition trip along the coast from Portland to Galves-ton, Tex., of the NC-4, the first plane to make the flight across the Atlantic, has been postponed one month. The plane is now expected to arrive here on Octo-

Aero Club of America Honors Admiral Fiske, Inventor of Torpedo Plane

The Board of Governors of the Aero Club of America announced on August 9 Club of America announced on August 9 that they had awarded the gold medal of the club to Rear Admiral Bradley A. Fiske, U. S. N, retired, for his invention of the torpedo plane, patented on July 16, 1912, which was used effectively during the war. Announcement was also made of the receipt of the following letter from Rear Admiral Fiske:

ter from Rear Admiral Fiske:

"I hasten to express my gratitude to
the Acto Club of America for the award
of its gold medal and to thank you for
your kind letter of presentation.

"To be awarded a gold medal is an
honor that any one should appreciate
profoundly. To be awarded the gold medal
of the Actro Club of America is an honor
that is exceptional, because the standing
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of the control of the standing of the sta very high, the effective work which it car-ried on throughout the war is not fully appreciated by the nation for the reason

appreciated by the nation for the reason that its work was unofficial, and therefore not recognized officially.

"Like many another unrecognized agency, however, its influence was potent and profound. Acting as the advance sout of aeronautic progress, the Aero Club continually gave information to the country of the possibilities of naval and country of the possibilities of naval and military aeronautics, insisted that those possibilities be utilized, and demanded that Congress appropriate such sums of money as would enable the Government Departments to utilize those possibilities completely and in time.

"Enormous appropriations were then made, but as Congress delayed making them until after we had actually entered the war, the appropriations came too late to permit American aeronautics to do as much effective work as it otherwise could

much effective work as it otherwise could in winning it.

"Your letter gives me more credit than I deserve for furthering the cause of naval and military aeronauties. What little I was able to accomplish should be credited to the Aero Clish of America and to the press of the United States, which supported the clubs efforts with such keen patriotism and intelligence."

comprehensive knowledge of the science

of aeronautics.

The school is conducted in a four-story fireproof structure with large and light

classrooms, laboratories and rest rooms, Michigan with direct transportation connections to all parts of Chicago.



Eddie Stinson's youngest passenger still in smiles at end of 75 mile cross country flight

Committee Going on Month Trip in Aircraft Inquiry

Announcement was made August 10 Announcement was made August in that the Subcommittee on Aviation of the House Committee on War Expenditures will begin at once a month's inquiry of charges reflecting on John D. Ryan, formerly head of the Aircraft Production Board. Representative Frear, Republican, of Wisconsin, chairman of the subcommittee, issued a statement of the programme, which is to include an inquiry into the sale of surplus linen, contracts for the production of castor beans for oil for Liberty motors, and various other

aviation matters.

A portion of Mr. Frear's statement is A portion of Mr. Frear's statement is devoted to criticism of Homer S. Cummings, chairman of the Democratic National Committee, because Democratic publicity recently referred to the proposed trip as a junket. Mr. Frear said this attack justified a statement as to the purposes of the inquiry to be made by him

and his colleagues on the subcommittee, and nis colleagues on the subcommittee, who are Representatives Magee, Republi-can, of New York, and Lea, Democrat, of California. "Protests from responsible persons on

the Pacific coast have been placed before the Pacific coast have been placed before our committee against a proposed sale of railway properties, mills, timber and the like on September 2, which have cost the Government presumably \$20,000,000 and more, all of which are involved in the charges. A letter from Senator Jones, of Washington, to President Wiston strongly urging an "honest to God' investigation was submitted to the commissions."

was submitted to the committee.

"A remarkable situation developed when we discovered that contracts, vouchwhen we discovered that contracts, vouch-ers and data covering nearly \$50,000,000 of spruce production expenditures were kept at Portland, Ore., and none filed here. The committee is called upon to find nere. The committee is called upon to find out what was done with money spent for sprince production and for logging roads costing more than \$100,000 a mile, useful for the Milwaukee and St. Paul Railroad alone."

Lands in 5,000-Foot Canyon in Yosemite Park

Mather Field, Sacramento, Cal.—Lieut. Earl E. Neuhig, from this field, com-pleted one of the most difficult flights ever pleted one of the most difficult flights ever undertaken, from Sacramento, Cal., into Yosemite National Park, the floor of which is 4,000 feet high. In order to make a landing in the park it was necessary for Lieut. Neubig to gain an altitude of 11,000 feet and spiral down between the walls of the canyon, which are 5,000 feet high and one-quarter of a mile wide. He landed on the field, which was very diffi-cult to reach owing to the high trees and cuit to reach owing to the high trees and wires surrounding it, and his plane stopped rolling just about 10 feet in front of a multitude of park visitors who were there to greet him.

The trip was made in a Curtiss H bi-lane powered by a Hispano-Suiza engine. plane powered by a Hispano-Suiza engine. The time between Sacramento to San Francisco, 90 miles in 90 minutes; San Francisco to Yosemite, 180 miles in 100 minutes; Cyosemite to Sacramento, 90 minutes; Yosemite miles in 90 minutes.



One of the new biplanes used by the New York Police Department, piloted by Captain Bruce
Eytings of the Aerial Police Reserve

45,000 Miles in Forest Fire Patrol

During the six weeks ending August 2, 56 fires have been discovered in the California forests by the aerial forest fire patrol, reported promptly, and quickly ex-

tinguished, causing only nominal damage. The corps of aviators from the three ine corps of aviators from the three cation of the foli-fying stations, Mather Field, Sacra-Mento; March Field, Alessandro, and station Mission of Rockwell Field, San Diego, have made edict Crowell, was 373 flights over the forest, a distance of 45,376 miles, in 38,545 minutes. To this d to me by Mr. can be added the wonderful work of the an Aviation Mis-U. S. Army Balloon School at Arcadia, who have maintained in the air night and day an observation balloon similar to that used on the western front, from which observation has been made personally by the commanding officer of the post and other high officials, including the entire staff, that the service may be maintained at a high point of efficiency. Many fires discovered have been quickly extinguished and no serious damage reported.

Eddie Stinson Carries Young and Old York, Pa.-"Eddie" Stinson, the famous exhibition flier, has carried the youngest and oldest passengers who have been up in an acroplane in America, the youngest being Miss Mitzi May Kuntz, aged eight months, and the oldest a across-country flight, and it was decided to take his bady daughter with him. Start-ing from York, they flew due north over then southeast to Cly; then southwest then southeast to Cly; then southwest few miles. The young passenger was smiling and happy after her aerial joy ride. ride.

Pacific Fleet Photographed 150 Miles At Sea

San Diego, Cal.—Taking with him two newspaper photographers, Captain Lowell H. Smith, who holds the record for flight between San Francisco and San Diego, flew 150 miles out to sea in order to ob tain photographs of the new Pacific Fleet. On the following day the photographs were delivered to San Francisco by aeroplane.

Venice, California, Opens Aviation Field Venice, Cal.-An aviation landing field was opened here on August 5. A group of Air Service officers and men from Ross Field participated in the ceremonies. Three ascensions of a 37,500 cubic foot Cacquot captive balloon, each with a para-chute jump, were made. The gas from the Cacquot was then deflated into a

spherical balloon and three flights were made, one a night flight of two hours over a distance of twenty miles, and two on the morning following.

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United States, to 1

(1) General orga of transportation Reno to Sacramento ill vo influtt

Pilot Lieut, W. C. Goldsborough, with passenger, Lieut, J. Parker Vanzandam, in passenger, Lieut, J. Farker Valleanigans, in a Delfaviland, on August 2 flew from Mather Field, Sacramento, Cal., to Reno, Nev., 130 miles, in 85 minutes. Maximum altitude was attained over Lake Tahoe 13,000 feet, and forced landing made at Minden, Nev., in 65 minutes flying time to Minden from Sacramento, against 13 hours by train.

National Geographic Society | Around-the-World Flight

Washington, D. C .- "Now that the Atlantic has been crossed and there are may not be far distant when some aerial Magellan will make an aeroplane tour around the world," says a bulletin of the National Geographic Society.

There are still many corners of the world where aeroplane, automobile and even the horse would be curiosities. And if a man set out to tour the globe and ing native conveyances he would have to:
"Resort to a donkey in Spanish America and in the Holy Land.

Climb alward a camel to traverse African deserts.

"Cross some rivers of India on the in-flated skins of bullocks, and others by a hridge of one rawhide rope.

Submit to the sea-going motion of an elephant when he continued his journey "Get into a man-borne palanquin at

Calcutta, "Jolt over Far Eastern roads in a non-

shock absorbing cart drawn by oxen, "And in China be prepared to climb into a jinrikisha, a sedan chair or a wheelbarrow

The bulletin continues with a series of picturesque illustrations contrasting aerial transport with systems still in vogue.

Forest Patrol for Oregon Being Organized

Salem, Ore.—Major A. Smith, officer-in-charge of the new acrial forest patrol squadron, which will operate in this vicinity in the near future, arrived here on August 8 from Medford, piloting a Cur-tiss 11 biplane. The distance of 210 miles was covered in 160 minutes.

Iowa Doctor Buys Aeroplane

Fort Dodge, Iowa.-Dr. F. C. Stahlee has purchased an aeroplane in order to enable him to make professional calls over the large expanse which his practice covers.

(2) Development Aero Club of Pennsylvania Merge With (3) Development Aviators' Club of Pennsylvania

Philadelphia, Pa.—The Aviators' Club of Pennsylvania, all of whose active members are fliers, has merged its active ties with the Aero Club of Pennsylvania, through its president, Joseph A. Stein-metz. By this arrangement the new organization receives the membership, funds, club rooms and books located at the clubhouse of the Engineers' Club.

The active officers elected, all of whom The active officers elected, all of whom are fliers, are: Captain Claude R. Collins, New York City Air Police, president; George S. Ireland, agent Curtiss Eastern Airplane Co., and Brooke Edwards, former army flier, vice-presidents; Charles W. Carvin, night flying instructor, secretary; Floyd Showalter, manager Essington School of Aviation, treasurer. Direction School of Aviation, treasurer. tors: John Bell Huhn, Murray Earle, George R. Brown, D. Willard Zahn and Sewall Cathcart. Mr. Richard J. Beamish, aircraft production expert, was made

an honorary life member.

The club will be divided into two classes, fliers and non-fliers. Only fliers will be entitled to vote.

The club is pushing the establishment of a municipal aerodrome. It is hoped to obtain through legislation a piece of land about a mile square on the banks of the Delaware River as near to the center of

the city as possible for an aerodrome.

Space around the edges of the field will be cleared, hangars built and leased to be cleared, hangar's built and leased to commercial enterprises at prices placed as low as possible. An aerial garage, ma-chine shop, dope shop, service station and supply store will be conducted in conjunction, with skilled mechanics always at hand. The clubhouse will be placed at the disposal of the firms using the facilities of the field and no interference with any enterprise will be offered by the club. This will furnish commercial enterprises with the best possible landing field at a low cost, mechanics and repair service, and supplies without waiting.



ion dollars' worth of American aeroplanes stacked at Colombey-les-Belles, in France—not brought down by some giant tornade, but scrapped under orders which Congress is investigating



Increasing Output

Buffalo, N. Y .- The local plant of the Curtiss Aeroplane and Motor Company is said to be planning operations on a monthly schedule calling for 225 aeroplanes and 200 motors.

Glenn Martin Completes Passenger Car-rier for Government

The Glenn L. Martin Company is com-The Glenn L. Martin Company is com-pleting the construction of a ten-passen-ger biplane on government order. It is expected that this type will be manufac-tured for commercial transport.

New York-Washington Aeroplane Pas-senger Service Planned

senger Service Planned
Washington, D. C.—According to a
communication from the National Air
Service Company, a regular passengercarrying service between Washington and
New York is to be inaugurated as soon
as safe landing fields are established. It
may be possible to obtain permission to
use Bolling Field.
A service between New York and BosA service between New York and Bos-

ton is also contemplated and the chambers of commerce of both cities have been asked for information as to landing fields. The National Air Service Company is ready to start operations as soon as landing arrangements are completed, it is

Aeroplane Mechanics School Starts in Spokane

Spokane, Wash.—The Modern Auto and Tractor School of this city is starting an aeroplane mechanics' school, as a result of the local interest in aeronautics. Sixor the local interest in aeronautics. Six-teen thousand dollars' worth of equipment-has been purchased. C. H. Messer, vice-president of the school, is in Detroit pur-chasing a Curtiss biplane and accessories. A pilot will be employed from among the local discharged men.

Five Courses Offered by Academy of Applied Aeronautics

Chicago, Ill .- The regular courses of the Academy of Applied Aeronautics which are being offered in addition to the two months' summer school course announced in our July 14 issue, are as fol-

Elementary Aeronautics: Three evenings per week for ten weeks. Elements aerodynamic theory; calculations; principles of aeronautical motors; laboratory and wind tunnel experiments.

Aeronautical Engineering Course lead-ing to degree of aeronautical engineer for college and technical graduates. An ad-

vanced engineering course.

Aeroplane Mechanics' Course, preperation for a position in commercial aeronautics. Theory, repair and inspection of aeroplane motors; principles of flight, rigging, tuning, repairing and inspection; housing and shipping of planes.
Post Graduate Course in Flying for

Post Graduate Course in Flying for graduates desiring flying experience. Af-ter qualifying for Aeronautical Engineer-ing or Aeroplane Mechanics' Course. Pilots' and Navigators' Course. A course leading to a pilot's license and a

comprehensive knowledge of the science of aeronautics

The school is conducted in a four-story fireproof structure with large and light classrooms, laboratories and rest rooms, conveniently located on the shore of Lake Michigan with direct transportation con-nections to all parts of Chicago.

Aerial Sightseeing Service Over Washington Washington, D. C .- A group of ex-army aviators have organized an aerial

sightseeing service over the city of Wash ington. A sixteen-mile flight from a field at Arlington in a Curtiss biplane will be regularly made for passengers every week day afternoon and all day Sunday.

The service is to be conducted by avia-The service is to be conducted by avia-tors recently released from the service, among them being W. W. Major, man-ager of the postal aviation field at Col-lege Park; Leon D. Smith, former pilot for the air mail service; Neal Angle, ex-pert rigger from the College Park field, and D. S. Collier, of the air mail service.

RETRACTABLE LANDING CHASSIS PATENT GRANTED TO JAMES V. MARTIN

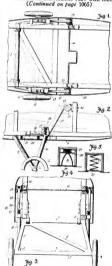
NDER date of June 17, 1919, pat-ent has been granted James V. Martin for an aircraft running and Martin for an aircraft running and alighting device known as 'the retractable chassis. This invention relates to a landing gear which is arranged to be drawn up to the body of the aeroplane while it is in flight, thereby materially reducing head resistance. The device takes care of the absorption of running jars and alighting shocks. The construction also revoides means for competable housing. alighting shocks. The construction also provides means for completely housing the device when the machine is in flight and when extended of closing the housings in such a manner as to present minimum wind resistance and not disturb the passage of air along the streamline of the fuselage when the recesses are not occupied by the alighting device.

The accompanying patent office draw-ines show some of the claims covered by Mr. Martin's patent. As shown in these drawings, a swinging frame is formed having a journal member (1) rigidly associated with end members (2) and outer sociated with end members (2) and outer members (3) to carry wheels (4) of any approved type. Bearing brackets (5) connected to the struts and longerons of the fuselage framework pivotally support the member (1), rigidity to the chassis frame as a whole being given by a sin-gle diagonal brace (6) which may be pro-portioned as shown, the parts 2, 3 and 6 portioned as shown, the parts 2, 3 and 6 of the chassis frame preferably having the cross sectional contour indicated in Figure 4 as the housed portion (8). The bearings (5) are so situated that the member (1) is at all times above the plane of the lower skin or sheathing (9) of the fusclage, and consequently is en-

tirely out of the path of the air current. Struts (10) are each journaled or piv-oted, as at (11), to the frame members (2), adjacent to the wheel bearings and are held in upright position when the chasis is restracted, by flexible connections (12) passing over suitable drums (13) (12) passing over suitable driims (13) on a crankshaft (14) operable from the fuselage, a ratchet mechanism (15) holding the same at any point desired. When the device is lowered, the upper end portions of the struts (10) are snapped under spring members (16) of the leaf type, further shock absorbing means being had if desired in the form of upright spiral springs (17) in compression between the leaf springs (16) and a bracket member (18). The release of the ratchet mechanism (15) permits the momentary lowering of the struts (10) until they are clear of and fall to rearward of the latches, both because of gravity and be-cause of the action of the wind in causing

them to swing back.

The flexible connections (12) with their



Plan side and front views of the J. V. Martin retractable chassis



Aerial Mail Trip Between San Francisco and Sacramento

San Francisco, Cal.—Inaugurating the first aerial mail service on the western coast, Lieutenant C. C. Nutt. carrying Fanchon Wolft, a well-known San Francisco of Sarramento in 45 minutes on July 31. The return was made in one hour. Two other De Havilands, piloted by Lieutenants E. H. Nelson and E. W. Kilgore, accompanied the mail plane. The aviators are the members of the Ellington Field Squadron. The flight was conduced use multiple supplemental control of the supplemental

Aerial Mail Service Between Canada and United States

The Aero Club of Canada has taken up

with the Canadian Postoffice Department the matter of delivering mail between Toronto and Buffalo, Syracuse, Albany and New York during the international

and New York during the international race for the Commodore prize of \$10,000. The establishment of an aerial mail service between the two countries is looked forward to with great enthusiasm by business men and has the endorsement of the chambers of comerce and civic organizations of Toronto, Hamilton, Welland, Albany, Syracuse and Buffalo.

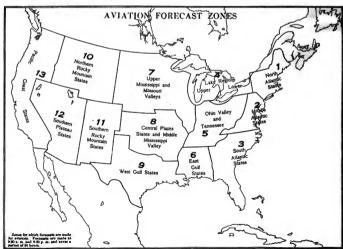
Aerial Weather Forecast Service Improved

Washington, D. C.—The weather bureau of the Department of Agriculture has prepared a map of the United States, divided into thirteen zones, for which forecasts are to be made for aviators and

balloon pilots. These forecasts are made twice daily, at 9:30 A. M. and 9:30 P. M., and cover conditions for the succeeding twenty-four hours. Since July 21, forecasts have been made

Since July 21, forecasts have been made with the country divided into seven zones, with such satisfactory results that the number of zones has been increased to thirteen.

thirteen. It Service has sent out the revised map to their active stations throughout the country and the forecast will be formative that the state of the forecast will be formative that all cross-country filers shall tended that all cross-country filers shall fore starting on any contemplated flight, thereby reducing, as much as possible, to a minimum the liability of injury to aviant public than the state of the sta



As an aid to aviation the Weather Bureau of the Department of Agriculture, in co-operation with the Air Service is issuing weather report on meteorological conditions twice daily, which are evaliable for civilian eviators. Map was prepared by Captain Charles J. Glidden, piones substantial and the Charles of the Charles

THE BRISTOL AEROPLANES

AS one of the pioneer firms in the aircraft industry particular interest attaches to the products of the British
& Colonial Acropiane Co., Life, of Fitten,
Exchange and the products of the British
in the earliest days with "box kites" of the
Farman type, laster followed by more
original designs by, in succession, Prier,
Forever, to entire of these dissipners that
the honor of designing the "Bristol" war
machines fell. This responsibility rested
upon Captain F. S. Barnwell, R. A. E.
war, and produced, in collaboration, we
believe, with Mr. Busteed, the little Bristol
sout of pre-war days. The first of these
machines was exhibited at the Olympia
similar machine was flown by Lord Carberry in the London-Paris-London race.
The first Bristol sout was not greatly different from the type D soout illustrated
tions as regarded immension, etc. arxiv.

The Bristol Scout, Type D

The original Britol seous had an area of only 18 as at, whereas the type D shown in the accompanying illustrations has a total wing area of 200 sq. ft. In general outline the type D is very similar to the original Bristol scout, the rudder, tail plane and fins, as well as the body and shape. The body is somewhat deeper in front, and the cowling is slightly different, shape. The body is somewhat deeper in front, and the cowling is slightly different, but otherwise the machine remains true to its prototype. Unlike several other makes of single-seater reactors, the Bristol has its of the staggered strets, a feature that has been considered undesirable on account of the extra drag stress it may impose on the internal brazing of the top plane, but in its countered by fitting external drag wirer running from the upper and lower ends of the rear interplane struts to the front of the fuselage. That this form of brazing is adequate would appear to be proved by no Britotal counts has ever shed its wings.



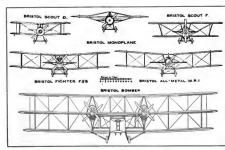
Above-The Bristol Scaut, Type F, with an air-cooled "Mercury" radial engine Below-The Bristol 170 h.p. Hispano engined all metal biplane

in the air. Several variations of the Bristol type D have been built. With the exception of the fitting of different energy of the property of

The Bristol Scout, Type F

The development of the type D scout takes the form of a single-seater tractor, designed for a much more powerful engine than was the type D. In connection

with the type F it should be pointed out that whereas the general arrangement drawings and the particulars in the two tables refer to a machine fitted with a 200 h.p. Sunbeam "Arab" engine, the machine sometimes has a slightly different arrangement, in which the nose of the machine is of different shape, owing to the fact that the engine is a radial air cooled, the Cosmos Mercury engine. In addition to the fact that it is fitted with a different engine, the type F Bristol scout shows variations in nearly all its other com-poment parts, having, in fact, practically no resemblance to the original Bristol scout. Thus it will be seen that the type F has its lower plane of smaller chord and span than the top plane. The wing tips also are of different shape, while the various tail members are totally different in shape. Owing to the deeper nose and, generally speaking, greater side area in front, a fixed vertical fin is fitted in front of the rudder. The wing bracing is characterized by centre section and inter-plane struts of N formation, and the dihedral angle has disappeared. An examination of the accompanying table of performance, etc., is instructive. It will be seen that while the type D had a wing loading of 6.25 lbs. per sq. ft. and a loading of 14.7 lbs. per h.p., the corresponding figures for the type F are 8.08 and 10, respectively. The speed near the ground is 100 m.p.h. and 138 m.p.h., respectively, while the climb to 10,000 ft, occupies 18.5 mins. in the case of type D, and only 8.5 mins, for the type F. It is thus seen that it would appear that "performance" is far more a question of load per h.p. than it is one of wing loading, and that it is in fact only the question of a reasonably low landing speed which prevents one from employing a much higher wing loading than is generally found.



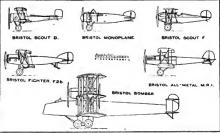
Front views of the Bristol aeroplanes

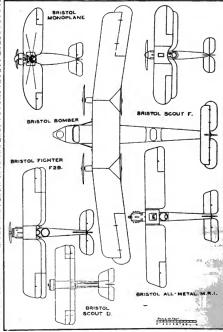
The Bristol Monoplane

With the exception of the very earliest days of the war, there has been, at any rate in Great Britain, a remarkable ab-sence of aeroplanes of the monoplane type. Some of the first machines to go out were, it is true, of this type, as for instance the Bleriots and Moranes, but before many months of war had passed the biplanes were rapidly supplanting the monoplanes, and during the last two years of war the monoplane was hardly if ever seen. This may appear somewhat strange, especially as the monoplane has undoubted advantages for fighting purposes, giving as it does a much better view forward and tipward. Especially is this true of the "parasol" type of monoplane in which the wings are on a level with the eyes of the pilot, but for some reason or other the type has not found general favor. Special interest, therefore, attaches to such few monoplanes as have been built during the war, among which is the Bristol monoplane. This machine, it will be seen from the accompanying illustrations, is of very pleasing appearance, with its stream-line body and crescent-shaped wings. Eti-ciency is the keynote of its design, with head resistance reduced to a minimum. Thus the wing section employed is such as to allow of very deep wing spars which are capable of taking care of their load with a minimum of external aid, in the shape of one wire to each spar. Lateral control is not by means of wing warping, as was the general practice in monoplanes as was the general practice in monoplanes before the war, but by allerons as in the biplanes. This form of lateral control is probably chosen in view of the deep wing section, which would tend to make a comparatively rigid wing structure difficult to warp and liable to excessive strain if warping were employed. In order to give the pilot a better view downwards—for-ward and upward is already as good as it is possible to make it-openings are provided in the inner portion of the wings, near the sides of the fuselage, and one is inclined to think that in this respect at least the Bristol monoplane is able to hold its own against any conceivable biplane combination. As regards performance: from the table it will be seen that near the ground the monoplane is capable of a speed of 130 m.p.h., which is distinctly good for an engine of only 110 h.p. At 10,000 ft. this speed has dropped to 117 m.p.h., which is not bad considering that the engine is a rotary. The climb also is quite good, the first 5,000 ft. only taking 3½ mins., while 10,000 ft, is reached in 9 As the landing speed is certainly not unduly high, it appears that taking it all round, the monoplane is able to hold its own against the biplane for performance, and there can be no doubt that as regards visibility the monoplane has it all its own way. For peaceful purposes we are not at all certain that the last has been heard of the monoplane type of machine.

The Bristol Fighter

Probably the best known of the Bristol products during the war is the Fighter (F2a). This machine has been eastern extension to the Briston to the Briston to the extension to the Briston to the Briston to extension the Briston to the Briston to the mining the F2a is that it was designed in the first instance, for the purpose for which it was intended, and not meetly of view and afterwards rigged up for certain purposes for which machines happened to be required. There is a decided





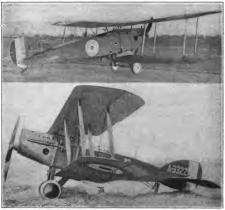
Plan and side views of the Bristol aeroplanes

difference between the two methods. Thus it will be observed that the designer quite evidently had in his mind to provide as free a field aft as possible, and to this end he chose to flatten the fuselage out to a horizontal knife edge, bringing the varions tail members down lower out of the way of the gun. Also the flat top of the body bears evidence of this intention. Again, it was desired to place the gumer and pilot high in relation to the top plane, and to do this would have meant, with the ordinary arrangement, a very deep body with consequent large maximum cross-sectional area. To avoid this the lower plane is not attached to the body, but rutts right underneath and some distance below the bottom of the fuselage. This arrangement has resulted in a somewhat more complicated undercarriage attachment, but, everything considered, there is little doubt that it lias been worth while.

From the table it will be seen that the performance of the Ear with Kulls-Royce "Fakcon" engine is very good indeed. A feature of this machine which will not be found in the table and which cannot be found in the table and which cannot be put in table form owing, to the absence of the performance of the Irstol Fajhert is endowed with a which renders her particularly casy to fly, it would, therefore, appear that Capain Barnwell has managed to find the solution to the problem of good stability combined with ease of control, a fact which the performance of the

The Bristol "All-Metal" Riplane

From the earliest days of aviation the question of wood versus metal construction has been the subject of discussion, and both methods have had their supporters. Up till the present, however, dominating, at any rate in Great Biritain. Particular interest therefore attaches to the few examples of the metal construction method that have been built. Among the accompanying illustrations. It will be seen that although the All-Metal machine is of somewhat larger dimensions than the Bristol Fighter, the loaded weight same. Against this must be put the fact



The Bristol Fighter, equipped with a Rolls-Rayce or Hispano Suiza engine

that the MRI has a 170 h.p. Hispano engine, while the F2a has a 200 h.p. Kolliston, which the F2a has a 200 h.p. Kolliston of the control of

plane, the metal construction will be better able to withstand the changes in temperature than wik one built largely of wood, and while we should not care to assert that the days of wood construction for aeroplanes are over, we do think that metal construction will be more general in the finiture than it has been in the past.

The Bristol Triplane

While for her largest machines Italy has to a great extent pinned her faith in the triplane, as instanced by the large Caproni triplane hombers, there has been in Great Britain a tendency, rightly or wrongly, to adhere to the biplane type, even for very large machines. That excellent results may be obtained by the biplane form has been amply demonstrated



The Bristol "Braemer" Tripiane. The four engines are Siddeley-Deasy "Puma", each 250 h.p. at 1500 ft.

Table of weights, etc., and performance of " Bristol " machines,

Engin	ie.	Weight of machine	caps	city	nge nilea).	(Speed m.p.h.).			ling.	lling eed.	ading ood.	d/sq. ft.	d/h.p.	Military load.
		(loaded).	2		E d	pus	000	8	8	8	3	Sta	and de	3	3	MA
Type.	H.P.	,lbs.	20	8	_	N of	0	15	0	50	ft.	m.p.h.	m.p.h.	ths.	lbs.	lbs.
Le Rh. S.A. Le Rh. R.R.	80 200 110 264	1,250 2,100 1,300 2,800	27 32 20 45	5 5 5 4		100 138 130 125			11.2 8.5 8.5 18.5	16'0 19'0			44 49 49 48	8.08	10.8	60 270 80 270
H.S. 4S.D.	170		50	5		110	98		20				47			270
	Type. Le Rh. S.A. Le Rh. R.R.	Le Rh. 80 S.A. 200 Le Rh. 110 R.R. 264	Engine. of machine (loaded). Type. H.P. lbs. Le Rh. 80 1,250 S.A. 200 2,100 R.R. 264 2,800	Engine. Weight of marchine (loaded). Type. II.P. Jbs. Le Rh. 80 1,250 27 S.A. 200 2,100 32 Le Rh. 110 1,300 20 R.R. 264 2,800 45	Engine. of (callons), machine (c	Engine Weight Capacity Ca	Engine Weight capacity Figure F	Engine Weight Capacity Ca	Engine Weight Engine E	Engine: Weight Engine: Engin	Engine. Weight Engine. Engin	Engine. Weight Expactly Graph Graph	Engine Weight Capacity Garden Garden	Engine. Weight capacity Engine.	Engine. Weight capacity Fig. Speed Speed	Engine. Weight capacity Gallon Gallon

Table of dimensions of "Bristol" machines.

	4.0	10	lag pan.	Wing chord.		Wing arra.*			Inci- dente.			i.	back	Dibe	dral.	area		Area		Area.		
Type of machine.	Length	Top.	Bot.	Top.	Bot.	Top.	Bot.	Total.	Top.	Bot.	Ç.	Stags	Smeep	Top.	Bot.	Atlaron	Tail-	Ble- vators.	Total.	710.	Rudder.	Total.
	t. in.	ft. lo.	It. in.	ft. in.	It. in.	59	uare fee		•	•	it. in.	It. in.	•	•		no. It	- 50	nare fo	et.	599	are it	et.
Monoplant	20 8 20 20 20 4 25 9 27 0 516	24 7 29 6 30 9 39 5 42 2 81 8	39 3 42 3 78 3	5 7 5 11 5 6 6 0 8 6	1 6 4 11 5 6 6 0 8 6	145	96-8 110 201-3 503	200 260 145 403 458 1,905	10 11 0 15	1 : 1	4 3 5 1 5 5 8 11 7 28	1 9 2 I 1 5	0000 04	58 6- 58 58	38 38 38	15°5 30°5 18 80 39	23 25 20 27-8 27-8 96-3	15 13 13 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15	35 45-4 37-8 151-5	4-1 3 10-7 7-8 28-2	3'8 4'5 7'8 8'25 8'25	9·4 9·8 17·9 16·05 53·2
			· Includ	ting eile	work.		Centre	plane :	Spi	. 81	feet 8	ins., c	bord	S fee	1 6	ins., as	rea 650	sq. ft				

by the large four-engined Handley Page, but it may be doubted whether the triplane form has been as extensively tested as it deserves. The object of the Bristol Bomber was to provide a high-speed machine for bombing or passenger carrying, capation of litting considerable load in The Capation of the Ca

Well aft in the body is another cockpit with two guns mounted on a turnshe, while a fourth gun is pounted on another gun ring in the floor of the fuselage. The machine is thus well capable of looking after herself as regards defensive gun arrangements. The following instruments are carried:

On dashboard: 2 air speed indicators. 4 radiator themometers, 4 revolution indicators, 4 Liberty switches and voltemeters, 1 switchbox for electric lighting, 1 altimeter, 1 cross level, 1 watch. Electric lighting set for each instrument.

Below dashboard: 1 compass.

In forward compartment: 1 air speed indicator, 1 altimeter, 1 high altitude bomb sight. These are for bomb dropping.

Rear of pilot's seat: I air speed indicator, I altimeter, I gyro bomb sight.

Flowmeters for petrol. These are for bomb dropping.
On engine housings: 4 oil pressure

gauges. The weight of the machine empty is 9,300 lbs., and she carries 400 gallons water. After allowing 360 lbs. for two pilots, the machine in still capable of lifting another 3,000 lbs., bringing the total loaded weight up to 10,200 lbs. total loaded weight up to 10,200 lbs. The loaded per horsepower is 16.2 lbs. The speed at ground level is 100 m.ph., which is not had for such a large machine, and use the load per horsepower is 16.2 lbs. The but of the load per horsepower is 16.2 lbs. The but of such a large machine, and the load per horsepower is 16.2 lbs. The but of such a large machine, and the load per horsepower is 16.2 lbs. The but of such a large loads. In the load per horsepower is 16.2 lbs. The but of large loads in the large loads.



The Bristol monoplane makes a speed of 130 m.p.h, with a 110 h.p. Le Rhone engine

SOME PROBLEMS IN THE DESIGN OF WOOD PROPELLERS

Relative Value of Different Woods. Advantages and Disadvantages of Different Methods of Blade Tipping

By LESLIE V. SPENCER, M. E.

T is safe to say that no part of the modern aircraft has been given more attention from the design and construction standpoints than the propeller. Yet, in the majority of cases, there is perhaps no unit of the ship that gives more trouble. There are so many things to be taken into account in making the stick, and so many different types and species of woods that can be employed, at development and research work or this part alone occupy as important a place in aeronautical engineering work as is given to the design of the engine or of the plane itself. Not only that, but after the propeller is constructed, very elaborate precautions must be taken to maintain it at a constant moisture content when in storage, else warping and crack-ing or parting of the laminations will result, rendering the screw of little value from the service viewpoint. In addition to all this, some means of covering or sheathing the blades is most advisable to protect them against tall grass, water spray, pebbles and the like, all of which are enemies of the rapidly revolving blades.

When it is further considered that any given shape and size of propeller is usually suited to only one design of plane, necessitating a different screw for each type of plane, it will be seen that the flying field having several different models or types of planes in its equipment will be confronted with the problem of storage for a large number of different shapes and sizes of propellers.

Bernelles Wood

A great many propellers of nearly every practical species of wood have been whirled to destruction at the propeller testing laboratory at McCook Field, and from the results obtained, it appears that propellers from the standpoint of strength Where screws made of many other woods could not withstand the required whirling speeds used in the tests, the calk proven the tests without breaking underwent the tests without breaking.

went the tests without breaking.
Walnut has proved itself almost the
equal of oak, and where properly designed, propellers of this wood are undoubtedly entirely satisfactory. Walnut,
however, is harder to obtain with satisfactory grain than oak, so that, all thines
considered, oak las a shade the advan-

"Stammats be remembered that this refers only to the strength characteristic of woods. In some instances the weight of the wood must be given great consideration, and as both walmut and oak are heavy woods, they might not always be most desirable, everything taken into account. In general, in selecting the wood for as given type of propeller, account of the weight and the strength, so that simply because a wood is very strong is not conclusive evidence that it is desirable.

Another very satisfactory propeller wood is Honduras mahogany, and while many species of mahogany have a tendency to split or warp, this variety seems well suited to propeller work. The average run of commercial mahogany, how-

ever, does not appeal to be very well adapted to propeller making for lack of strength. African and Philippine mahogany is not very highly regarded for propellers because of this cracking and warping habit under load. Perhaps these differences between the various species of the wood are due in large measure to the fact that mahogany as a designation



Figure 1
Cross section of a flat sawn blade. The use of quarter-sawed wood would result in more nearly parallel growth rings

for woods is a much abused term, in that the characteristics of the different types vary widely, so much so that it is often considered that many species of woods that go under the name of mahogany are in reality not mahogany at all, but very likely some related wood having somewhat the same appearance.

Cherry is another wood that has given in the construction of most standard types of propellers. The wood possesses great sirength, and has a certain elasticity or "give" to it that is often a desirable feature, especially in certain designs of screws.

Poplar and spruce are good woods for the ordinary propeller shapes, although not recommended for sticks that are of a design which has a tendency to fluttering at high speeds. Spruce is comparatively

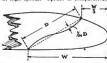


Figure 2

Dimensions of a good type of brass tip for ordinary service conditions

weak in tension (weaker than oak, walnut or mahogany).

Prima vera has also been experimented with, but it is not very highly regarded for propellers. Being a very hard and dense wood, it is heavy, and its hardness leans to heritdeness, which often has resulted in cracking under test loads. It is possible that there is not enough elasticity to the material to take care of sudden applications of heavy loads, and as prima

vera does not appear to have advantages that many domestic woods have, while at the same time it possesses several disadvantages, it does not appear to merit much consideration for the purpose.

There are, of course, various combinations of woods that have proved very satisfactory in the construction of propellers, such as mahogany and walnut, oak and cherry, etc.

Quarter Sawing

With the object of reducing warping and curling of the blades, it is advisable to use quarter-sawed laminations in perference to find-sawed pieces, this applying of woods. Where flut-sawed material is meployed, usually the direction of the growth rings in the several laminations is such that unequal warping results from such that the proper of the pr

Methods of Blade Tipping

No process of tipping the blades of propellers (particularly the leading edges) has as yet been devised that is entirely satisfactory from all standpoints, although the development of the use of such material stands of the development of the use of such materials and the stands of the development of the use of such materials and the stands of the sta

gree of success. It might be well here to draw a distinction between the tipping or covering of the covering o

Copper and Brass Tips

There are no sees to deservice for which the treat life of copper or bras seem to be the only kind suitable. These are training planes and seaplanes or flying boats. With the watercraft, it is evident that the greatest protection must be afforded against the constant water spray when the seaplane is on or close to the

water courface, and nothing short of a metal leading edge seems to be satisfactory. With training planes, due to the service they perform, the propellers are of necessity given very severe usage, since of necessity given very severe usage, since the plane must do a great deal of taxi-ing and warming up of the engine. About half the time that a training plane engine is running the ship is on the ground, which means that the propeller of such a plane is subjected to abrasion from one cause or another to a very much greater extent than that of a plane in regular service, since the latter is usually in the air a good share of its engine's running time.

It is true that at most training fields, measures have been taken to protect the screws as much as possible by having wooden platforms or concrete pavements on which the planes are run whenever the engine is to be operated for any length of time on the ground. This, of course, reduces the chances for abrasion from the picking up of loose matter, but it is of no value as soon as the plane is put through taxi-ing manœuvers such as required to give the student a working knowledge of the ship before it goes into the air.

Earlier difficulties with the heavy metal tips are now in a large measure overcome by accurately locating the holes in the by accurately locating the noise in the metal so that the attaching rivets or screws will be in exactly the same posi-tions with respect to the two blades, thus preserving the balance of the propeller, and also by carefully staggering and locating the rivets or screws so that there is less tendency to split the wood and to pull loose due to the high centrifugal forces set up in operation.

Of course, the metal tip is not satisfactory for the very light type of propeller which tapers down to quite a thin tip. It is very difficult to attach the metal tip to such a blade without the screws splitting the thin wood or pulling out when the propeller gets in service. Further, the light blade is prone to fluttering excessively when metal covered, a disadvancessivery when metal covered, a disadvantage that soon means cracking of the wood or of the tip or both. The propeller must have sufficient body to form a satisfactory "anchorage" for the metal sheathing, which limits this kind of tipping to the heavier sticks such as used on seaplanes, large service machines and most training planes.

An important consideration in the use of metal tips is the lapping. There have been many instances where poor solder-ing or improper position of the seam have resulted in the tips pulling loose or opening up in service. It is best to have the lap at the leading edge, the metal being carried around on either side of the edge so that there is a double thickness at this point. The seam should be on the back face of the blade. The English specifications call for a lap on either side of the edge of 11 millimeters, and this has proven quite satisfactory. In American practice, about % inch is best.

As to the matter of screws or rivets,

the general rule is to use one brass screw per square inch of metal surface, or one copper screw per 1½ square inch of surface. The screws should of course be stackered as referred to the front and back faces of the hlade, and they should also he carefully positioned with respect to the grain of the wood so as to elimi-nate as far as possible chances of splitting from striking the grain improperly. This especially applies to the screws at the outer ends of the blades.

In designing metal tips, care should be taken to bring them well in toward the hub on the leading edge, the trailing

edge being more or less unimportant, except in the vicinity of the tip. It has often been found that, where the length of the tips on the leading edge was inadequate, chewing would take place along that portion of the edge from the tip in toward the hub, where otherwise the blade was all right. The length of the tip should be anywhere from one-quarter to two-thirds the length of the blade, the exact distance being dependent upon the kind of service for which the propeller is to be used, etc.

be used, etc.

A typical form of a brass tip is shown in figure 2. This tip is best made of 24-guage material, and there should be 114 screws in each face of the tip, these screws being % inch No. 4. Such a tip would ordinarily be suitable for a service plane or a training machine subjected to moderately hard usage. Referring to figures 3, 4 and 5, some

typical cases of tip failures are illustrated. In figure 3 the blade was too thin for the tip and the resulting flutter cracked the tip and the resulting flutter cracked the wood, as can be seen, with the end of the metal sheathing finally cracking off. Fig-ure 4 indicates what happens to a metal tip when coming in contact with a stone or pebble of fair size. This tip was struck on the leading edge by the stone, and the metal was split in several places as a result. Figure 5 illustrates a case where the tip has pulled away about A case where the tip has pulled away about My inch due to centrifugal force or loose-ness of the attachment. This might be the result of using the wrong kind of screws or rivets, or from not correctly spacing them.

Cotton and Linen Tipping

Although cotton and linen will not, of course, give the tips as much protection (Continued on page 1059)

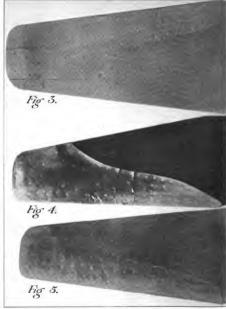


Figure 3 This blede is too thin for a metel tip. Fluttering crecked the wood and chipped off a portice of the tip

Showing a crecked tip due to a large stene hitting the leading edge. Even the metal is not prejection against such accidents Figure 5
Centrifugal force has pulled this tip off shout ¼ inch—the result of improper attachment avusualiable acress or rivets

PRELIMINARY NAVAL FLIGHT INSTRUCTION

By NICHOLAS S. SCHLOEDER

(Continued from page 1016)

"URNS which are comparatively "safe" can be made in great variety, but an exactly correct adjustment of bank and curve can only be executed by exercise of much care. In most turns, the pilot either skids or slips. Skidding out-ward results from too little "bank," which compensates for centrifugal force; or conversely stated, too much "fudder." centritugal force; or conversely stated, too minch runder. Slipping inward is the result of excessive bank, the centrifugal force being insufficient to keep the machine in its normal trajectory. Usually the skid or slip is very slight, but a stu-dent should strive to make his turn as nearly perfect as possible.

Certain suggestions will assist a student in a proper adjust-ment of controls. First of all, it is usually necessary to de-press the nose to make up for loss of speed on a turn. In press the nose to make up for loss of speed on a turn. In relation to this, overbanking has a tendency to raise the nose, as skidding has to depress it. Another point to remember is of nearly all imperfection in turning. To make embryo aviators feel their turns is the subject of much vain pleading on the part of instructors. Lastly, the proper sequence in the use ically, all controls should be used at once, the following empirical rules for students should be helpful. Firstly: Use elevators to depress nose slightly. Secondly: For left-hand turns alternot to moderate leads, and barry's, popping similar turns alternot to moderate leads, and barry's, popping similar manufactors. right-hand turns, aileron and rudder may be applied simulta-

The difference between turns to the left, and right, is due to the action of torque. Though any tendency to confine one's self to a habitual turn one way or another should be discourated, set it must be learned that greater care is exercised in all evolutions to the left. Skidding is far more common on left turns because a student forgets that troppe alone is sufficient, and therefore by ruddering even slightly to the left, excessive applied unless a sharp turn is desired, in which case the bank must be correspondingly steep. For moderate turns to the left a release of the customary right rudder is sufficient. A student must learn by feeling. Wind on the side of his face will assist. Wind pressure felt on outside denotes a skid, on the inner side, a slip. Of the two, skidding is more objectionally and a more unstable condition, implicing the use of The difference between turns to the left, and right, is due to

feet, it is a more unstable condition, implying the use of excessive rudder, which on left turns where a tendency to stall

excessive rudder, which on left turns where a tendency to stall exists, directly invites a spin. To illustrate this point, alternative the point, alternative the point, alternative the point, alternative the powered machine, we will assume. He is close to the water and is about to make a turn. He is anxious to "get around," we will say. He applies hard rudder. The machine skids, as considerable bank is necessary to compensate the centrifugal force outward, which of course, the student fails to execute Now the machine, moving as it does, sideways as well as forward, thereby loses some of its lifting power and conse-quently settles. The student now becomes alarmed, fearing quently settles. The student now becomes alarmed, fearing that he will strike the water before completion of his turn. man ne, wiii strike the water betore completion of his litrit. He instinctively pulls back his elevators, hoping to raise himself. What has resulted? He is now in an ideal position for a spin—rudder hard over, cleavators pulled back. A bimp sends the nose up, and—over he snaps, tail up, outer wing littled, hitting the water at an oblique angle. Some one on the beach shouts "sideslip!" which is once more incorrectly held responsible; whereas in fact, it was nothing less than the first part of a spin, due originally to a skid.

the first part of a spin, due originally to a skid. If a student is tanght to begin a turn cautiously, it is not necessary to impress upon him the need of alteroning and theory that it takes more control to start a turn than to maintain it. This is largely true only of sharp turns. Too much control at the start with subsequent correction, is responsible for the jerky, slovenly turns, alternately steep and flat, nose up and down, so characteristic of beginners.

Getawaya
The getaway or take-off includes three distinct phases, fundamentally the same on all machines, though differing considerably in the length and degree of each phase. They are, in order, raising the nose of pontoon or hull clear of the water; throwing the pontoon on the step over the surface of water, and finally, planing on the surface of the water until flying speed is attained and the machine takes the air. The purpose of the first phase is to clear the nose of ma-chine from interference by waves. The elevators are pulled back to the chest. However, in smooth water, this is unnec-essary. Indeed, it is desirable to hold elevators in neutral

whenever the sea permits.

To force a machine out of water and on the step, the yoke is thrown forward when the nose of the pontoon has reached its maximum height, and so held till the nose slowly drops as the machine climbs on the step, when the elevators are gently pulled back to neutral. Considerable pressure is often required to hold the elevators forward, though in some machines, as the Curtiss R's, the machine climbs on the step of its own accord.

Many beginners experience difficulty in knowing they are planing on the surface. The fall of the nose and increased speed are certain indicators. If the student is slow to dis-



Two flying boats from the Miami Navat Air Station going to the

cover this and continues to hold the yoke forward, violent "porposing" or rocking forward and aft will result. The student should under no circimstances attempt to combat this by moving his dereasers lackward and forward. Simply positing" stops at once. Sometimes the piot pulls back too far, so that the machine jumps off the water nomentarily, before attaining air speed, a condition closely approximating a true porposise. This is very common in H-boats and K's, and the student must learn to distinguish between it and a and the student must learn to distinguish between it and a true porpoise, which is always the result of controls held for-

ward of neutral.

Difficulty will be experienced in putting a machine on the step whenever the engine is failing. Many devices are used in such cases. Some endeavor to rock it on; that is, by jerking yoke forward and back, they hope literally, to throw it on. This is a common fallacy. This motion constitutes a drag This is a common fallacy. This motion constitutes a drag and hinders rather than helps by resultant reduction in speed. Whenever a machine must be "put" on the step, the controls should never be held more than two-thirds of the maximum distance in front of neutral. Rocking is advisable only distance in front of neutral. Rocking is advisable only through a slight are about neutral. I have found that an are from neutral to slichtly in front of it is the most effective; rudder and allerou action is helful to overcome the chance of a vacuum having been established behind the step. All other methods fail where the shallow water method will

All other methods hall where the shallow water method will succeed. Running through water having a maximum depth of about three times the draught of the machine, to a mini-num depth equal to its draught, is unfailing where the ma-chine will fly at all. The water, having no chance to escape, piles up in front of the low of the pontoon, so that the ful-crum moves far back to the rear of the pontoon and with this additional (everage the machine easily attains the surface.

The final phase, the take-off, presents no special difficulties. The controls are held in neutral as the machine skims over the surface until flying speed is attained, when it takes the air without assistance. A machine should never be dragged off. Care should be taken to keep the wings level, otherwise a wing tip pontoon will bury itself in the water, causing the machine to swerve. Only with Rs are the elevators held back of acotral in the take-off; they are neutralized at once upon charing the water to greetest alling. This tendomoto stall climb; this will take care of itself, and will certainly not be assisted by rathing.

climb; this will take care of itself, and will certainly not be assisted by stalling.

The getaway is always into the wind, unless as on the high seas, when it is sometimes, advisable to run parallel to the waves. To keep a machine into the wind, hard rudder is frequently necessary, especially where a wing tip pontoon has caught in the water. Failure to keep into the wind is the cheef failing of students. Learn to keep the wings level and use rudder actively, which is necessary to take-off in a neat direct course into the wind.

Landing Landings are the bane of most preliminary students, who are inclined to exaggerate their importance and difficulty. The

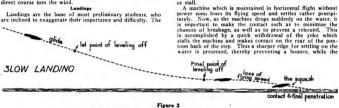


Diagram showing how the machine m suvres in a slow or "squash" landing

principle part of a landing, briefly, are the glide, first point of leveling off, final point of leveling off, loss of flying speed, the squash, contact with water and inal penetration of water. Landings may be conveniently divided into two kinds, differing slightly in the relative time and place of these phases, and are variously called speed or step landings, and stall, squash or slow landings.

or slow landings.

On all machines save F-boats, it is not particularly advantageous to assume a globing angle before the engine is throughout the property of Failure to do this is a very common fault. Many instructors exaggerate the importance of a steep gliding angle. Notice, I speak now of the glide to a landing, which should always le straight into the wind from an altitude of not less shan two and the changers of flat glide are absent. These exist only in and from spirals, etc., where the rudder is out of neutral. Remember, spins do not occur with neutralized rudder, and "sips on one wing" only through positive stalls. Moderate glides are best for beginners, as it aids them to find the water and so shortens the period of instruction. However, the status and so shortens the period of instruction. However, the status dent should learn to glide steeply as soon as he can land.

greater penetration of the water acts as a cushion to prevent breakage. More important still, the tail landing implies a maximum angle of incidence, which markedly increases lift, and thereby arrests the suddenness of squash and force of

as speed is the best insurance against adverse air currents just above the water.

The second phase, the first point of leveling off, occurs between fifteen and twenty-five feet up. The elevators must be gently withdrawn, otherwise the pilot will find himself in horizontal position before he is within striking distance of

Indeed, this movement should be so regulated that the third phase, the final point of leveling off, should not occur at a greater distance than about three feet above the surface of

greater distance than about three feet above the surface of the water. When this occurs directly at the surface, the landing is said to be fast. Thus, the position of this point determines whether the landing is store or squash, and the sequence of subsequent phases. One of flying speed, occurs simultaneously or after contact with the water in a step landing, in slow landings, immediately follows the completion of the third phase, which, occurring above the surface, involves another phase non-existant in step landings. This is the squash or stall.

Contact. The last phase, final penertation of water, occurs after contact with water in step landings. In coming off the step no difficulty is experienced save in R's, when a tendency to porpoise exists. Throwing the yoke forward is the quickest way to arrest this

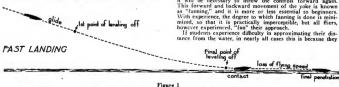
The diagrams, Figures 1 and 2, illustrate the difference between fast and slow landings.

In stopping for a moment to consider relative advantages of each type, it might be stated that step landings are not taught preliminary students. It will be readily seen that if the final point of leveling has occurred before contact, the pontoon will strike on its nose with great force, thereby either "nosing in" completely, or rebounding again to ten feet or more, where it will again be necessary to open the throttle and proceed, as recovery otherwise is very difficult for beginners. Sq of safety. Squash landings, on the other hand, have a margin

of sarety.

The point of original leveling does not present special diffi-culties, as most students fix this within the proper attitude.

However, there is a tendency to pull back too much, so that the leveling off process is completed too soon. In that event, it will be necessary to throw the controls forward again.

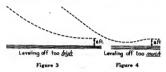


The path taken by a scaplane in making a fast or "step" landing

look directly beneath them. They should look as far ahead of the lower wing as their vision permits.

The point of final leveling off presents greater difficulties. The student places this at the proper height, but fails to maintain it because he permits the machine to ascend once more. This is termed "leveling off too much," as distinguished from "leveling off too high." Figures 3 and 4 give illustrations of this difference.

Leveling off too much is the more common fault. To combat it the student must learn to act quickly and throw his control forward the moment he finds himself once more ascending, always remembering, however, to pull back again the instant this upward movement is arrested. Hence the great importance of fanning.



The phase which includes loss of speed in air has the fac-ulty of trying the patience of the student, for he appears to dislike holding the machine level. He signalizes this as a rule by either a premature attempt to put it on the water, with a certain relound at this great speed, or by leaving back in anticipation of the time to squash, which results in a veritable "secon". moor'

landings hitherto well executed, with the point of loss of flying speed at the proper height, are spoiled by failure to "squash" properly. As the machine settles the controls to "squash" property. As the machine settles the controls must be pulled back rapidly, often to the closest. Bear in mind, no matter how the glide, the approach, or the animal control are well back and that the tail of the pontoon is the point of contact. Failure to do this is the cause of more faulty landings than all other faults.

It is better to level off too high than too low. Some students confuse leveling off too high with too much, and therefore attempt to compensate by steepening the glide. This only augments either error, because the faster the glide, the quicker will the leveling off process occur, with greater resultant reas-cension. Others hope to correct these faults by not leveling off at all, and these are the despair of instructors.

Flexibility in controlling and a resolution to land on the Flexibility in controlling and a resolution to land on the flexibility in controlling and a resolution to land on the flexibility in controlling landing. Likewise, the student must ever bear in mind that the psychological idea uppermost in landing is not to put machine on water, but rather to permit it to put itself on. Recovery from a "bounce," is quite important. Where the

Recovery from a "bounce" is quite important. Where the rebound is hard, open throttle and proceed, particularly when it results from failure to level off. When a skip is slight, it occur on slow landings from failure to "squadif "machine on the tail of pontoon. In such cases throw machine forward as it travels upward, and quickly pull controls back to chest as it settles. Generally it is not necessary to proceed with throtte from a bad stall landing, for the first contact in such cases is always the hardest.

is always the narces.

Sometimes when the student is in doubt as to the real cause, it is permissible to give half throttle and hold controls back until the machine settles to water. This is called a power

Hitherto, on this subject, I have spoken almost exclusively of longitudinal control. Now it is quite as important to maintain lateral stability as in flight. Landing on one wing, causing machine to swerve violently, places great strain on the

structure.

Not the least important is the use of rudder in order to maintain landing, directly into wind. Cross-wind landings result in side offirit, usually incorrectly referred to as a skd. The wind will carry machine sideways, and such a landing places greater strain on the pottoon structure. To minimize this it is necessary to kick rudder into direction of drift; an attempt to overcome this drift by ruddering against it will only aggravate the fault. This is a very important-feature of landing. Should a true skid occur, the same rule will

The fundamental principles which govern spirals are much the same as turns; in one case the motive power is derived from gravity, in the other, the engine. Many students forget this, consequently the failure to bank quite as much as on turns results in the common fault of skidding. This is par-

ticularly bad in a flat glide, as it invites a spin.

In executing a spiral, the rules of rudder and aileron action apply as on a turn. Care must be taken, inasmuch as gravity is the motive power, to glide straight until sufficient momentum is attained. Overanxiety to begin the turn is a common fault

In shooting a mark, students are often so intent on reaching it as to disregard the necessity of momentum, with consequen On the other hand, students often go to extremes to spills. On the other hand, students often go to extreme to avoid a flat glide, as the spiral seems to confuse their judg-ment. Nosing down too much, while it is not dangerous, is nevertheless amateurish and inexpert. A pilot should not lose over one thousand feet in a complete turn, which is a safe margin for a beginner.

In spiraling into the wind for a landing, if the pilot finds that he cannot quite get around, it is preferable to land cross-wind, rather than take a chance of making a too sharp turn just above the water.

"Flipper" spirals will be considered in the remarks on inverted control.

Inverted Control

The theory of inverted control in air flight is the substitu-The theory of inverted control in air flight is the substitu-tion of resistance to centrifugal force for that to gravity. In other words, an inverted control turn, commonly called "Ripper" turn, is made so sharply that the reaction due to centrifugal force becomes more potent than that due to weight.

As may be presumed from this, the amount of bank is rey, great, myling methods in the second of the move from norzontal. Now when the bank is great enough to imply inverted control, this change has progressed to the extent that the rudder is more or less horizontal, the elevators vertical. Thus, in relation to gravity, the rudder has become the elevator, and the elevator the rudder; hence the name "inverted control."

The practical way to accomplish an inverted turn varies. The install method is to begin a customary turn until a forty-degree bank is attained. As the degree becomes greater than this, the yoke is gently pulled back so that when the bank is practically vertical, the controls may be back to the chear. The farther back the controls, the sharper is the turn. The The farther back the controls, the sharper is the turn. The extent of withdrawal is so regulated that the nose of the machine remains just above the horizon. If there is any tending to stall in so doing, this simply signifies that the machine is not banked enough for that degree of elevator

withdrawal. The rudder position does not change, becoming a slight "down rudder" in the inverted position. Some experienced pilots do not use rudder at all in turning, but simply bank to the proper degree and then pull back correspondingly on the elevators. Some indeed, earry this to extremes, actually applying reverse rudder, which then becomes "up rudder" by the invertion; the lank in such cases must be very steep, and the invertion; the lank in such cases must be very steep, and the invertion; the lank in such cases must be very steep, and the invertion; the lank in such cases must be very steep, and the lank in such cases must be very steep, and the lank in such cases must be very steep, and the lank in such cases must be very steep, and the lank in such cases and the lank in the lan it is necessary to rudder hard in order to make a sharp turn. Too much down rudder will precipitate a spin, particularly to the left. With excessive "up rudder," it is first necessary to stall and side-slip. The greater the bank the lesser the rudder used.

rudder used.

To complete an inverted turn, invert the order of beginning.
To complete an inverted turn, invert the order of beginning against bank and finally, neutralizing all surfaces.

The principles which govern "flipper" spirals are substantially the same as in turns, as before, differing only in the substitution of gravity for engine as the motive power. Speed substitution of gravity for engine as the motive power. must first be attained, and the descent regulated by the rudder (which has become the elevators). Too much "down rudder" will lead to a spin. On the other hand, with sufficient bank, will lead to a spin. On the other hand, with sutherent bank, and controls back, many scaplanes, such as R's, will take full "up rudder" without either spinning or stalling. A partial side-slip will result, with sufficient forward momentum to maintain the reaction to centrifugal force against the arc of the turn

A skillfully executed "flipper" spiral is one of the prettiest and most difficult evolutions in flying; more so than many so-called "stunts."

(To be concluded)



NAVAL and MILITARY AEDONAUTICS A



Britain Pays Air Service \$27,000,000

Washington, D. C.—According to a letter made public by the War Depart-ment, an agreement between the British Government and the War Department has been reached and a check for \$35,176,-123.10 has been drawn to the credit of the United States; \$26,947,069.10 of this amount is for the account of the Director of the Air Service for the following:

Liberty motors.... \$13.672,518.90 Aeroplane spruce. 13,274,554.20

\$26,947,069.10

This settlement is unique in many way This settlement is unique in many ways, including the large amount involved, the fact that most of the agreements entered into were verbal, and that no arbitrational committee was required to settle the matter. Chester W. Cuthell represented the War Department and Lord Moeforth, the Minister of Munitions for War, the British Government.

Air Service Authorized to Make Exhibition Flights

Washington, D. C.—According to an announcement of August 7, issued by the War Department News Bureau, the Director of Air Service is being authorized to grant requests for aeroplanes for exhibition flights whenever consistent with nibition flights whenever consistent with necessary activities of the Air Service, condition of material and the number and degree of training of the Air Service personnel provided all expenses incident to such flights are assumed by the local authorities.

All-American Pathfinders to Make Transcontinental Recruiting Flight

"The All-American complete squadron of thirteen Curtiss arms biplanes, fully equipped, will start on a transcontinental flight from Mineola to San Francisco August 13. The planes will be under command of Major Ora M. Baldinger, and will fly in squadron formation throughout. The titnerary of the flight embraces fifteen states and covers

4,183 miles. Stops and exhibitions will be made at 171 cities. This nation-wide flight is to be a cam-paign of education for the people of the

country, as well as a recruiting campaign for all branches of the army. It will show the public the actual working of an air squadron operating away from a fixed base for the first time in the history of the country. The detachment will consist of twenty-two commissioned officers and eighty enlisted men, all specially chosen for their particular technical branch of the service.

The squadron has been divided into The squadron has been divided into seven sections, each performing a distinct function. The first is the headquarters and advance section, which will be the executive head for the unit, and also arrange for all base stops prior to its actual arrival

The aerial routes, mapping and landing field section will compile and record all important aerial information. The recruitimportant aerial information. The recruit-ing section will examine and accept re-cruits for all branches of the army. The flying and field operations section will di-rect all flights. The other sections are rect all flights. The other sections are radio, photographic and balloon and air-

The radio section is equipped with the latest type of apparatus. Radio tele-oliones will be used on all the machines, phones will be used on all the machines, and will be operated over all important cities. Semi-daily reports of the progress of the squadron will be made to the War Department in Washington by wireless.

The halloon and airship section carries The balloon and airsnip section carries six specially constructed balloons known as the propaganda type. These will be flown at all base stops. In addition a full-size type "K" observation balloon will be inflated at each stop, so the public can examine the type of lighter-than-air craft used in the war. An accurate working model of the latest type of dirigible operated by electric power also will be ex-

In addition to these a special search-light and field lighting section from the engineer corps has been attached to the squadron. This section carries a com-

plete searchlight unit of the 60-inch anti-aircraft dishpan type. This light has a power of 250,000,000 candles, and its beams can be seen by an aeroplane from a distance of 110 miles. This section has also a complete field lighting set for illuminating an aeroplane landing field at night.

Rank and Strength of Officers Reserve Corps

Corps
Washington, D. C.—A statement has been issued by the Statistics branch of the General Staff, giving the number and range of officers requesting regular army commissions in all branches of the services up to July 18, and the number and rank commissioned in the Officers' Reserve Corps up to July 31.

Requested Con. in Air Sorv. Ess. Army.	freers' Best. Corps. Avis. (Flying).	burd in Of- ferry Res. Corps. Avia. (Non-flying).
Lieut, Col 3	0	0
Major 36	22	99
Captain 209	90	301
First Lieut 561	446	621
Second Lieut. 1,529	4,025	1,818
Totals2,338	4,589	2,839
In addition 15 have b		

In addition 15 have been commissioned as second lieutenants, balloon section, Of-ficers' Reserve Corps, up to July 31.

270 Planes for Panama Canal Patrol Washington, D. C.-It is stated that 270 planes have been shipped to the Pauama Canal zone for patrol duty.

648 Air Service Contracts Yet to Be Liquidated

Washington, D. C.—The Statistics Branch of the General Staff announces Branch of the General Staff announces that 648 contracts for the Air Service remain to be liquidated. The average value of all contracts liquidated or to be liquidated is \$351,000 and the average value of those remaining to be liquidated.

value of those remaining is \$297,000.

The value of the uncompleted portions of suspended War Department contracts that had been liquidated to July 19 totals with the control of the cont \$1,715,605,000, or 46.1 per cent of the total value of suspensions as reported to that date.

All Long Island Flying Fields to Be Abandoned

New York, N. Y.—According to state-ments appearing in the press, it is said that orders have been issued for the abanthat orders have been issued for the aban-domment of all army flying fields on the Hempstead Plains of Long Island, which include Hazelhurst, Mitchel, Roosevelt and Brindley Fields. Col. Archie Miller, in command of all flying activities on Long Island, when questioned denied any Long Island, when questioned denied any knowledge of the alleged order. The rumor states that the 1,000 or more en-listed men stationed at the field have been ordered to aviation fields in Florida and Texas. The 500 or more serviceable planes at these points are to be kept in hangars under guard of four or five men in charge of a sergeant.



The British Aerial Transport Company's commercial, passenger or mail carrying biplene. has a useful load of 1000 pounds, and is equipped with a Rolls-Royce Eagle VIII

Montank Point, Long Island.-The Montauk Naval Air Station, which was built here at an expense of several million dollars, was closed officially at 5:02 P. M. on August 4, when the flag lowering ceremony took place for the last time. and its building and machinery soon will be scrapped

Abandonment of the station had not been expected so soon, and until recently mechanics had been at work there to complete the dirigible C-6, sister to the C-5. The C-6, which was almost ready to fly, is to be disassembled and shipped to Santiago

Problems in Wood Propeller Design (Continued from page 1054)

as metal, these materials are being used very satisfactorily in ordinary work. In applying fabric coverings, that portion of applying labric coverings, that periodi of the blade tip which is to be covered is first tooth scraped parallel with the grain to form a good surface to which the glue will adhere. Then the surface is coated will adhere. Then the surface is coared with a glue sizing material, the dampened fabric being also given a glue sizing coat at the same time. Then, beginning at the leading edge, the non-working face of the blade is covered with the fabric, all irregularities or ridges being worked out by the fingers until a good, smooth sur-face is obtained, the fingers being moved from the leading edge to the trailing edge.

Then by using a small rounded stick, all air pockets and excess glue is worked all air pockets and excess give is worked out, starting at the center and working toward the edges. Next the fabric is ironed down carefully with a hot iron to absolutely insure uniform adjustion of the cloth all around, and to eliminate any trace of puckering, formation of air pock-With the trailing edge covered, ets, etc. the fabric is trimmed flush with the leading edge, and when the blade is turned over for the application of the fabric to this side in the same manner, an overlap on the non-working face at the leading edge is made. This should be about ½ inch wide.

This tipping process is done before any of the finishing varnish or filler is applied to the propeller, and with the fabric in place, the next thing is to proceed with the application of the filler to the nontipped portion, after which the fabric is given two coats of aeroplane dope, twenty minutes to an hour being allowed between the application of the two coats. A light sanding of the doped fabric comes next, when the entire propeller is ready for its final finishing with spar varnish

As already brought out, the fabric tip is not advisable for other than land ma-

Montank Naval Air Station Abandoned 60 Per Cent. of Air Service Contracts 36,000 Miles of Army Cross Country Liquidated

Washington D. C .- According to a statement prepared by the Statistics Branch of the General Staff on August 6, \$288,170,000 of the \$480,598,000 of Air Service contracts outstanding at the end of the war have been liquidated. This represents 60 per cent of the entire

To secure the liquidation of these contracts payments totalling \$64,511,000 were required, or 22 per cent of the total liquidation. Thus a saying of 78 per cent has been made

chines. Such ships are rarely exposed in regular service to such severe conditions sufficient protection to make their use ad-visable when the great simplicity of put-ting on such tips is taken into considera-Besides affording good protection against abrasion of the leading edges, such tips act as a sort of binding that in most cases holds the fibers of the wood to-gether at high speeds. In this they have a great advantage over metal, for being very light and there being no holes in the wood, the centrifugal forces and splitting action of metal sheathing is overcome. Fabric tips are not much protection against water spray, as tests and service have shown. It soon wears the fabric completely off the leading edge, although not disturbing that part of it on the faces themselves. But for ordinary mist, flying particles, pebbles, etc., it is safe to say tion to warrant its use in preference to other tips, all things considered.

Pig Skin Covering This method of tipping, as might be expected, is the next thing to metal when it

comes to protection against long grass. sand, gravel, wet grass, and the like. will take care of the propeller blades even when subjected to water spray, where the water is not of too long a duration, and in many instances has proved very satisfactory where a plane had to be out in rain. There is no doubt that properly applied

pig skin, with its known wearing qualities, acts as a strengthening agent for the wood, preventing the fibres from pulling apart when the stick is subjected to high In fact, in many tests pig skintipped blades have withstood high rotative speeds for long periods showing any sign of failure. The without This material is, however, harder to apply than fabric and for general all-around conditions it is a question whether or not it possesses enough advantages over linen or cotton to warrant its use in preference. Planes

Washington, D. C .- The mileage flown by Army aeroplanes in cross-country This figure does not include the mileage devoted to the instruction of enmen, of whom twenty-nine have already qualified as pilots.

First Enlisted Man Pilots an Aeroplane Over the Sierras

Reno, Nev.—Sergeant T. J. Buckley, in Curtiss JN6-11, made a flight from Sacramento to Calneva, 195 miles, in 108 minutes; Calneva to Reno, 65 miles, in 48 minutes, at an altitude of 14,000 feet. He is the first enlisted man to fly over the Sierra Nevadas.

that have to do a great deal of night flying or those operating in wet or damp regions, though, would best have propellers with tips of this material in preference to fabric, for reasons above brought out.

Other Methods of Tipping

Various other schemes and materials have been put forth for propeller tipping, but none of these have as yet shown re-sults that are the equal of fabric or pig skin when all advantages and disadvan-tages have been weighed. For instance, celluloid, hard rubber, zinc and aluminum spraying and composition coating have been tried with varying degrees of success.

celluloid coverings might at first thought seem very advantageous, but in tests it was found that this material, due to its shiny texture, gives off a reflection that is very objectionable to the pilot, The sun's rays cause it to make a glare that is dangerous in its blinding action upon the occupants of the plane. Being a brittle material also, it is easily cracked unless of a goodly thickness, which means

weight. Hard rubber deposited over the surface has not matched up to expectations of those who thought this would be the solution of the problem. Of course, from the strength standpoint, rubber would not be considered, but it was primarily intended as protection against stones, pebbles, etc., well as being impervious to moisture. But it chipped very easily in tests, and has been discarded.

Sprayed metal would seem to have possibilities, although very little development work has been done along this line. It has shown itself, in what tests have been made, to be very good protection against flying particles and rain drops and spray, as well as tall and wet grass. However, as it is much harder to apply than most other coatings, some simpler methods than now used would have to be worked out before it could be considered practical, and it is a question whether the effort is



A view of Parkwater-the avealiant 500 acre Aviation Field at Snokane Wash



FOREIGN NEWS



Non-Ston Flight from Madrid to Rome

Rome.—Aviator Stoppan, politing an acrephane from Madrid to Romen arms Stoppan, politing an acrephane from Madrid to of the same day.

The flight was made without stop, by was of the Guif of Lyons, Madrid was the stopped of the Guide of the Stopped Madrid was the stopped of the Guide of the Stopped Madrid was the Stopped of the Stopped of the Stopped of the Victor Emmando of Italy.

First Flight Over Canadian Rockies
Lethbridge, Alberta.—Capriain E. C. Hoy made the first flight over
the Canadian Rockies in a flight from Vancouver, B. C., lasting over
14 hours. He took off at 4:13 A.M. and arrived at Lethbridge, about
500 miles distant, at 6:22 P.M.

Aircraft to Compete with Cables

Mr. G. Hell Themstorpasser et a Airenti Manufertuning Co., in a paper before the London Society, read an instructive paper on Technol and In Future Aereil Transport. Mr. Thumas solfides the Technol and Society, read an instructive paper on Technol and In Future Aereil Transport. Mr. Thumas solfides the Committee of the Technol and Technology and the Committee of the Committee o

King George, Chief of Royal Air Force

King George, Chief of Reyal Air Force
London, Ang. — King George has assumed the title of chief of the
force have been given by King George, maneley, Marshall of the Air,
corresponding with a Field Marshall, Air Chief Marshall, corresponding
Vice Marshal, corresponding with Bingdierd choreal,
mander, corresponding with Bingdierd choreal,
mander, corresponding with Bingdierd choreal,
and air Chief Ch

Berlin-Munich Airship Service

Berlin.—Zeppelin airship service beween Berlin and Munich will be inaugurated in the near future, says the Vossische Zeitung. Flights will be made regardless of weather conditions, and it is expected that the journey will be cycered in seven hours. The fare will be 300 marks (normally \$753.

Brazilian Government to Finance Transatlantic Flight Preparation Rio Janeiro.—A give of \$1,500 for the first Brazilian or Portuguese resolution introduced in the Chamber of Depuies. The measure calls resolution introduced in the Chamber of Depuies. The measure calls amount not exceeding \$15,0000, it is provided that the flight shall not require more than 168 hours. The control of the provided of the control of the con

R-80 to Start Passenger Service Between London and Brazil S

8.40 to Mart Passesper Service Between Lendon and Breaff Seen Lendon—The Desity Graphic, says that the first passacegor airship is due to sail from Barrowin-Pariness to Rio, de Jindere some time destruction of the passacegor airship is desired to the passacegor airship will be passacegor and the passacegor airship will be passacegor and the passacegor airship will be passacegor and passacegor airship will be airship will be passacegor air will be passacegor airship will be passacegor

Five Metered German Aeropiane Fella Carrying Gold to Ukraine Blertin—A special despatch to the Lobbitaneaper from Rybnia, upper works fell on August et during a flight, killing server of its occupants, including the pilot, Blodwerd Ret Blot, Blot,

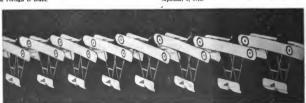
Bolivia Employs American Officers to Bulld Up Air Service

neutria Empleya American Officers to Build Up Air Service
(2 against Dunial Hurlaw, formetry a member of the first parsait group
Builder of the first parsai

Aviator Makes Non-Stop Flight From Santiago to Buenoa Ayres

Buenos Ayres, Argentina.—In making his non-stop aeroplane flight from Santiago, Chile, to this city on August 5 in 7 hours and 10 minutes. Lecurant Locatelli, the Italian avisaro, averaged approxi-mately sixty unles an hour. His greatest altitude was about 17,500 feet.

Berlith Abereit Mehre Resched Quantity Frederics in Quick Tas-landen — The record of Romen, Proteir & Qu. Led., of Jascolla, in Taslanden — The record of Romen, Proteir & Qu. Led., of Jascolla, in reaching quantity production density was filled to the contracting factories and the rescent reaching the production of the protein of the property of the purpose three was produced and the production of the property of the purpose three were taken over and on the dolling ground—originally a march, if a proper—may of them girls—had to be trained, but in spate of all diffi-cialities the first acreptant was completed and accepted by July 13th, originally a produced of the property of





ELEMENTARY AERONAUTICS

MODEL NOTES



THE ILLINOIS MODEL AERO CLUB HAS MADE A CLEAN-UP IN THE CONTESTS FOR THE AERIAL AGE AND VILLARD PRIZES

THE Illinois Model Aero Club has made a clean-up in the model contests for the AERIAL AGE prizes, as well as winning the Henry S. Villard Trophy for the third and final time.

Although many clubs throughout the United States competed for the rich prizes offered, none made the showing that this club did. Their records are something to be justly proud of and each member of this studious and growing club should be congratulated.

The Aero Science Club of America and the Pacific Coast Model Aero Club were completely outclassed by their friends in Chicago and their only soothing salve is the fact that they will have a chance to turn the tables at a later date.

The results of the llinois Club's context are really wooder-ful in view of the fact that most of the older members are advanced above the model stage and are devoting their time to the large machines. This leaves the field open to the latest members, who have shown that they have the makings of real champions in model aeroplane flying.

You would think that they would be satisfied to win the beautiful Villard trophy and call it a day's work. No, not these young conquering heroes; they believe that anything half done is not done at all, so they went out to win all or none, and they sure have done their work well.

This should not deter the other model flyers throughout the United States; in fact, it should be an inspiration, as it is just as

easy for you to be successful in the game if you devote your time and energies to the intricate construction and design of a successful long-distance rating model. Many designs of racing models have been shown on this page and any of them are capable of travelling 2,000 feet or over with a little practice.

The secret in long-distance racing is to have a light model with large wing surface, large diameter propellers and just enough rubber to turn the propellers about 800 r.p.m. These models float more than they fly and very little propelling force is needed to push the model through the air. In the

near future we will again illustrate and describe a longdistance flying model.

The winners of the Rising from the Ground Contest for

medal.

the AERIAL Age prizes, namely, the Gold, Silver and Bronze medals, which were shown on this page some time ago, are as follows. (Winners, distance, club and prize);

Schweitzer, 1,805 feet, I.M.A.C., gold medal. Lucas, 1,447 feet, I.M.A.C., silver

medal, Jaros, 1,273 feet, I.M.A.C., bronze

The Long Distance Model Contest winners are as follows:

Schweitzer, 2,778 feet, I.M.A.C.,

gold medal. Pease, 2,410 feet, I.M.A.C., silver

medal. Jaros, 2,108 feet, I.M.A.C., bronze medal.

The Villard Cup was won by the following team. (Name, total and average):

Schweitzer5,369 feet 1,789 2/3 feet

Cook, 5,240 feet, 1,746 2/3 feet. Jaros, 5,023 feet, 1,674 1/3 feet. Pease, 4,959 feet, 1,653 feet. Lucas, 3,739 feet, 1,246 1/3 feet.

The beautiful Aerial Age Cup for the best constructed scale model of the flying or non-flying type was won by Henry Smalline, of 227 Lewis Avenue, Brooklyn, N. Y. His model was an exact

copy of the little Berkmans scout and is indeed worthy of this beautiful prize.

THE LENRY'S VILLAY MOEL AEROPLAN PROBHY

The Henry S. Villard Cup which is now the property of the

More contests are to be held in the near future, and I would advise the readers who do not get ARBIAL ACR regularly, or who have to depend on some newsdealer supplying them, to subscribe for the paper, if only for six months. Special offers regarding subscriptions can be had by applying to the Subscription Department.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Everything is Going Up

Caller: "It's a good thing to teach your boy the value of money, as you are doing."

Host: "Well, I don't know. He used to behave for ten

cents, but now he demands a quarter."-Boston Transcript,

A Model for the Aircraft Industries

"How did Solomon get his great reputation for wisdom? queried Mr. Meekton's wife.

EQUATION She-"Would you call his doing the figure eight higher mathematics?"
He--Yep. Plane geometry." -Philadelphia Evening Bulletin

"Oh, I am sure, Henrietta, it was not through anything he thought up for himself. You know he had a great many wives and he probably listened carefully to all their advice." -The Watchman-Examiner (Philadelphia).

Join the Air Service

"Rastus, why doan you-all jin de Navy 'sted of de Army?"
"G'way fum here, niggah. Ah kin run fastah den Ah kin
swim, and Ah can drop fastah than Ah can run."—Mutual Welfare News.

The American Eagle

Blue spreads the sky above me Gently blows the western wind, I trundle the little "pursuit" out And closely tuck me in.

The "Liberty" hums a merry tune Seeming eager to be off, I gently wave the "mechs" aside. And swiftly soar aloft.

Below me spreads the countryside With camp and village, hill and mead, I note the river's silvery thread. And softly guide by flying steed,

This is the life for bird and man, My soul exultant is and glad. While, unbidden, memory conjures up. The magic carpet of Bagdad,

Swiftly above the clouds we rise. My willing steed and I And on the sheeny, fleecy things We look down from on high.

Again we view the landscape o'er, 'Tis Mother Nature's lap, And wrest the very secrets from That ever changing map.

The trench, the gun or tortuous road, The wood or farmhouse grey, I fix their menace or harmlessness. Then quickly speed away.

I sit and dream of fairy tales Of Pegasus' wonderful horse. Of twenty-league boots or flying chests And they're a matter of course.

I travel far on wings of winds I see all the wondrous sights That gladdens the American Eagle's eye Or dwell in Arabian Nights.

Oftimes the bursting shrappel shells Like pursuing Trolls come after But soon we maneuver out of reach Or pass them by with laughter.

Sometimes we meet the drawon for And by wrille or baffling loop We elude his deadly fiery breath And swiftly on his tail we swoop.

Then when the day is ended And the golden red is dveing he west We gladly circle homeward

H. F. Greaves, A.E.F.



THE AEROPLANE IN AFRICA Giraffe—"Here, you, be careful whom're going. The next time you hit me a neck I'll bite you." -Philadelphia Evening Bulletin





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(Continued from page 1044)

in conference appears an extraordinary similarity in condition and in conclusions drawn from the experiences of the five difficult years of mistake and achievement in the prosecution of the war. Perhaps no stronger or more simple presenta-tion of the regard in which the future of a visation is held in allied countries can be given than by quotation from two letters of M. Clemenceau, copies of which were obtained in France. The first is addressed to the President of the United States, urging upon him the immediate consideration of mat-ters aeronaultical and in connection with the experience of the control of the control of the Re-sident of the control of the control of the control of the separate department of aeronaultics placed transitority under the Ministry of War—an intermediate step possible without and in conclusions drawn from the experiences of the five the Ministry of War-an intermediate step possible without legislation and looking to the early creation of an independent Ministry of the Air:

FEBRUARY 16, 1919.

The President of the Council, and The President of the Interallied Peace Conference. To the President of the Republic of the United States. Interallied Aviation Committee: Mr. President:

I have the honor to acknowledge the receipt of your answer

I have the honor to acknowledge the receipt of your answer of February 7 to my letter of January 24. I enclose here with the property of the p clauses for aerial protection seem to me to have at least an importance equal to the clauses for military and naval proimportance egial is of the greatest interests to have a study made by competent personalities of the measures to have a study made eventual constitution of a German military fleet. I cannot insist too strongly on the imperious necessity of this study on account of the proximity of Germany to London, Brussels, Paris and Rome.

Likewise, I adhere entirely to the British proposition, which seems to be practical and effective, and I request you like-

wise to give it attention. In case it seems acceptable to you, wise to give it attention. In case it seems acceptable to you, I wish you would let me know if you could delegate two representatives to the next meeting of the new Interallied Committee, which will take place on Thursday, March 6, at ten o'clock, at the Directory of Aeronautics, 260 Boulevard St. Germain.

Please accept, Mr. President, the assurance of my highest consideration, etc.

(Signed) CLEMENCEAU.

REPORT TO THE PRESIDENT OF THE REPUBLIC. Paris, June 6, 1919. Mr. President:

Aircraft has developed considerably during the war. should at this time adapt itself to a no less important part in peace time. But because of the many initiatives which cooperate in its new use and development the efforts and means

operate in its new use and development the elrors and means are dispersed in various ministerial departments. The future of aviation in France will only be assured by the coordination of all efforts and the unification of the gen-eral services. Also, it will give the advantage of better work from the personnel and credits, which are actually effected to similar objects in different ministries.

With this object in view, and according to the propositions of an interministerial conference which I am able to assemble. I have the honor to submit for your signature the following decree creating an organ of general coordination of aviation.

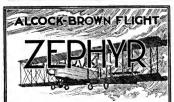
This should not be confused with any of the particular avia-tions of the various ministerial departments. At its origin it tions of the various ministerial departments. At its origin it will be attached transitorily to the Ministry of War. I am, sir, yours respectfully,

GORGES CLEMENCEAU,
President of the Council, War Ministry.

Even before the report of this Mission can be given consideration a step similar to that proposed by France will have been taken by Italy. Here, however, the Department of Aeronautics is being placed under the Ministry of Transportation

—a makeshift arrangement frankly acknowledged transitory and immediately possible without the legislation needed to Air.

England more than two years ago began the coordination (Continued on page 1067)



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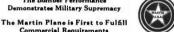
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THE GLENN L. MARTIN COMPANY CLEVELAND

Contractors to the United States Government As a result of this construction, an

(Continued from page 1047) accompanying drums and springs, are housed or concealed within the space housed or concealed within the space between the fueslage frame and side sheathing (19) of the fuselage, which is spaced therefrom and curved to give the desired streamline contour. The bottom desired streamline contour. The bottom wall of the sheathing (9) is provided wall of the sheathing (9) is provided with a longitudinal slot or opening at each side of the fuselage frame, as indicated in dotted lines at A, A in Figure 1 to re-ceive the members (2) and permit the members (10) to pass upwardly inside the sheathing when the chassis is folded or retracted, and likewise said bottom sheathing has a transverse opening and a diagonal opening covered by members forming recesses or chambers to receive the chassis frame members (3) and (6), respectively. A filler plate (20) or closure is provided for each opening or closure is provided for each opening in the sheathing and each plate is normally projected by springs (21) when the pocket is empty to afford a substantially flush continuation of the skin or sheathing (9) across the pocket mouth, the filler being pressed back into the recess as shown in Figure 4 when the chassis frame is drawn up as indicated in dotted lines in Figure 2. Furthermore the cross sectional shape of the members 2, 3 and 6, of the chassis frame, as clearly indi-cated in Figure 4, is such that the lower surface (22) thereof is substantially flat and likewise forms a substantially flush continuance of the surface (9) when the chassis is retracted, so that the wind re-sistance is thereby minimized. As a further detail of construction the exterior sheathing may be so positioned as to en-velop the wheels when the device is retracted, while at the same time the lower rim of the wheel is in place where it can act as a support.

alighting device is had that is completely concealed with the exception of the bearconcealed with the exception of the bear-ing wheels within the fuselage when the machine is in flight and that when ex-tended offers minimum wind resistance because of the single bracing member and the cross sectional contour of the parts while the springs are positioned to minimize the stresses encountered by the device when the machine encounters the ground. All the weight of the machine is communicated almost directly to the wheel through the vertical struts with-out appreciable effect on the frame that the wheels are mounted on, so that the latter cannot tend to materially distort the frame and the same can therefore be made extremely light.

War Department Moves to Protect Its Inventions

Washington, D. C .- The War Department authorizes publication of the following information:

retary of War that inventions relating to retary of War that inventions relating to military affairs made by those in the mili-tary service of the United States and in the discharge of their official duties are not being patented by inventors, but by certain contractors, who embody these in-contractors, who embody these in-obtaining papers in their own names, and are collecting royalties for same.

are collecting royalties for same. The above action is illegal and has resulted in material loss to the Government, All heads of departments, chiefs of bu-reaus or other agencies of the War Department having to do with the making and enforcement of contracts, are directed to consider Act of July 1, 1918, which amends Act of June 25, 1910, which ex-tends remedy afforded patentees by suit in Court of Claims for compensation for

use of their inventions.

The heads of departments, bureaus, etc., are directed to take necessary steps to protect the Government by assisting employees to establish their rights to inventions, making full reports of the facts in each case.

each case.

The transfer of the Inventions Section from the War Plans Division to the Operations Division is completed by a general order soon to be published to the Service. Hereafter, communications, re, inventions, including suggestions, ideas or plans of operation submitted to the Gov-ernment for inspection, test or sale, received from any source, including the public, and any office of the War Departpublic, and any office of the War Depart-ment, staff, corps, supply depot, or any headquarters of military establishment will be referred directly to "The In-ventions Section," Operations Division, General Staff, Washington, D. C. Ad men belonging to the service who have ideas for improvements in any of the tions freely.

It is also directed that hereafter all communications re, rights to inventions and patents originating in military servand patents originating in mintary service other than Staff Corps and Supply Bureaus, be forwarded to Patents Section, Purchase Branch, Office of the Director of Purchase, Storage and Traffic Division, General Staff, Washington, D. C., except communications re, inventions or devices submitted to the Government for inspection, etc., from a technical standpoint, re-ceived in the War Department, shall be referred to Inventions Section, Opera-tions Division, General Staff, Washing-ton, D. C., as heretofore.

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FIRE-AUTOMOBILE-TORNADO-EXPLOSION-RIOT AND CIVIL COMMOTION

(Continued from page 1063)

of her aircraft setivities—an effort which has resulted in placing her well in the lead in practically every place of arrial development, and which has resulted in bringing her months ago to the establishment of a Ministry of Air, coequal with her Ministries of War and of the Navy. That the present Ministries both for War and for Air centered in the same individual has no significance other than that of momen-The whole trend of events touching the art of aeronauties

The whole trend of events touching the art of aeronautics in its broad relation to world progress, the experience in all allied countries including the United States) during the five years past, the trankly discussed future plants under present encountered by us. leave your Mission impressed with these unsesquable conclusions:

1. That Italy, France and England realize fully the importance of aircraft in the military-naval and civil-commercial aspects, and purpose to encourage the general development of the art through governmental aid to commercial industry.

2. That Great Britain has come to consider the dominance of the air as at least of equal importance with that of the seas, and in frankly and avowedly planning a definite policy of aerial development to that end.

3. That any future war will inevitably open with great aerial activity far in advance of contact either upon land or sea, and that victory cannot but incline to that belligerent able to first achieve and later maintain its supremacy in the air.

4. That for economic reasons no nation can hope in time of peace to maintain air forces adequate to its defensive need except through the creation of a great reserve in personnel, material and producing industry through the encouragement of civil aeronauties. Commercial aviation and transportation development must be made to carry the funnical load.

5. That no sudden creation of aerial equipment to meet a national emergency already at haud is possible. It has been proven within the experience of every nation engaged in the war that two years or more of high pressure effort have been needed to achieve the quantity production of aircraft, airpersonnel, including engineering, production, inspection, mainpersonnel, including engineering, production, inspection, maintenance and operating forces—covering some fifty distinct trades and some seventy-five industries—has proved in itself a stupendous task when undertaken upon the basis of the war emergency alone.

6. That the rapid adaptation of aircraft to the commercial uses of peace is everywhere being studied and planned. Under the forced draft of war, this newest and fastest agency of transportation has been brought to a high state of development. It must now be redesigned to meet the progressive demands of a civilization at peace.

7. That because of its great speed and range of operation, occans, states, and even countries, are being passed over with a greater facility than are townships and counties traversed by the motor car. The need for international agreements governing the construction, operation and safety of aerial appearatus of all kinds is immediately before us.

8. That for the first time in the world's history the stage is set for a close international cooperation in the development of a great art at the very threshold of its era of commercial utility. Great Britain, France, Italy and Japan not only invite but urge the United States to share in this work.

9. That just as we now have national, international and interstate regulations, laws and agreements covering rail and steamship travel, and the safety and navigation of the seas, so must we have similar regulations governing aircraft and the uses of aerial navigation throughout the world. The International Convention drawn by the International Committee sitting in Paris under the Peace Conference, gives the first long step in this direction.

10. That the need in each country for a single authoritative point of contract for the counter of all international aviation affairs, legal, operational, technical and political, is imperative. Such accordes have already been set up in England, France and Italy. The United States has under the terms of the International Convention no notion but to follow these leads.

and Italy. The United States has under the terms of the international Convention to option but to follow these leads, 11. That in Enchand, France and Italy sentiment is undoubttional transfer of the Italy sentiment is undoubtunder one authoristative head. Difference of ontinion has been encountered only in the matter of Army and Navy personnel and in the question of the independent lighting force.

England holds the initiative and is building her Royal
(Continued on page 1008)



Flexibility and versatility, resulting from combined stability and strength, commend Boeing Seaplanes to professional pilots and to sportsmen of the air. Ability to stand up under the most gruelling tests and day-in, day-out service, the result of perfected materials and refined craftsmanship, assure safety and day-in, day-one service, the retail to perfected naturates and in termited cristmanning, as the sector to the most during. The greatest spruce-producing country in the world, surrounding the place of Boeing manulacture, gives its best wood to Boeing aircraft. Boeing Scaplanes combine symmetric and assymetric stability to a degree never historic attained. May we address you a personal letter?

BOEING Seaplanes

BOEING AIRPLANE II S. A.

(Continued from page 1067) Air Force co-equal with the Army and Navy. France and Italy follow England with the Army and Navy. France and Italy follow England in the Army and Navy Capartiests of operating personnel for the present to War and Navy Departments, and to debate the need of an independent fighting air service. In all cases, forces operating in conjunc-tion with military and naval units function under the military

or naval high commands. 12. That among the many considerations of early moment requiring governmental direction may be mentioned the fol-

- lowing: (a) Federal and International laws governing the use of
 - (b) Federal and International control of pilots' licenses; examinations and tests required.
 - (c) Federal inspection of all commercial aircraft for air-worthiness, or suitability for service. (d) Customs and other regulations for cross State and
 - National boundaries. (e) International standards for methods of communication
 - and signaling (f) International standards covering the marking or chart-ing of air routes and of landing places for both day
 - and night use. (g) International specifications and rules governing the construction, equipment and operation of standard aerodromes, landing stations, signal towers and other
 - aids to aerial navigation.
 - (h) Port regulations and fees covering seaplantes.
 (i) Federal taxation of aircraft and license for its use.
 (j) Safety measures and devices; legislation forcing adoptions.
 - tion. (k) Fire underwriter standards, regulations and safe-
- (R) Fire underwriter standards, regulations and safe-guards; insurance of machines, of material and of persons in transit (property and life).

 (1) The legal status of privately owned aircraft; the prop-erty rights of the air; liability for damage inflicted and incurred.
- (m) International standards and specifications covering accepted practice in quality of materials, in factors of safety, and in methods of construction; an engineer-ing literature of this new art must be created by International approval.

(n) Maps and navigation charts of the United States and its territories

- 13. That we of today are conceivably no more qualified to judge as to the scale and development of the aircraft of ten junge as to the scale and development of the airCraft of tre-years hence than were we of even five years ago able to fore-tell the achievements of today. We must bear in mind always that for every one mind focused upon things aeronautical in this earlier period, some thousands of keen minds are now versed in the aircraft art. With proper governmental encouragement, rapid progress seems inevitable.
- 14. That the broadest consideration for the ultimate welfare of American aviation must be given in the constitution of any or American availor minst be given in the constitution of any organization set up for the co-ordination and control of aero-nautics within the United States. The prerogatives and ambitions of governmental departments and of individuals must be assayed at true value.
 - 15. That past experience and every economic consideration point to the vital need for the formation by the United States of a definite, comprehensive and continuing policy for the development of every phase of the aircraft art. Our Government is now faced with the task of nursing and actively encouraging a new transportation industry, whose healthy growth is vital to the future progress and defense of the

Because of the lack of a definite, intelligent and sympathetic policy in our governmetal aircraft organization since the armistice, our American aeronautical industry, built up at armistice, our American acronations moustry, built up at such great expense of money and of effort, is rapidly disap-pearing. No sensible business man is justified in keeping money invested in the aircraft industry under the conditions which have maintained in the United States since November 11

16. That the closest possible relations must continually exist etween the aircraft agency of the Government and the production and commercial industry engaged in aircraft development.

17. That the industries involved in the production and commercial use of aircraft must be given recognition and repre-sentation in connection with all national and international activities bearing upon the direction and control of aeronautics.

(To be continued)



Vol. 9, No. 24



An Aerial View of the National Capital

Trans-Continental Aerial Derby Being Organized by Aerial League 11/2 (000) Goos e



///////

As pioneers in the manufacture of spark plugs for airplane engines we have a background of experience that may prove of value in the solution of your ignition problems. We invite consultation.

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	Trucks	Delco-Light	Jordan	Moline-Knight	Premier	Stroubel Engines
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	Appleton Tractors	Duesenberg Morore	Kissel Kar	Nelson	Robinson Fire	Tiffen Trucks
	Aubura	Eagle Tractors	Kleiber Trucks	Nelson Tractors	Trucks	Titan Trucks
	Avery Tractors	Eases	Klemm Teucks	Nelson & Le Moon	Rock Falls	Tower Trucks
	Beck-HawkereTrucks	Frderal Trucks	Appa Tractors	Trucks	Rowe Trucks	Treso Motors
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,	Brockway Trucks	Gabriel Trucks	K-Z Trucks	Noble Trucks	Samson Tractors	United States Motor,
	Buffato Motors	Genco Light	La Crosse Tractors	Northway	Sandow Trucks	Trucks
	Bugatei	G. B. S. Motors	Lattey-Light	Onkland	Saton	United Trucks
	Butck	G. M. C. Trucks	Liberty	Old Reliable Trucks	Scripps-Booth	Verrec Motors
	Cadillac	Gramm-Bernatein	Liberty Algeraft	Oldsmobile	Scrippe Motors	Vien Trucks
	J. I. Case T. M. Co.	Trucks	Mertury	Owens Light &	Seugrare Fire Trucks	Word La France
	Chalmera	Gray Dort	Lecomobile	Power Plants	Seneca	Trucks
	Chandler	Hickory	Maccae	Packard	Signal Trucks	Westcutt
	Chevrolet	Hell Trucks	Maibohm	Paige	Singer	White
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Model Notes

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IT was once the exceptional surgeon who made his rounds by automobile. What about visiting patients by acro-

plane?

Not a bad idea, according to Dr. F. A. Brewster, of Beaver City, Nebraska. Called to Herndon, Kansas, to perform an operation, Dr. Brewster covered fifty-five miles in fifty minutes, reached his patient, operated, and returned in another hour to his home. He had Curtiss service. His is one of a number of experiences showing how the air road is the road to patient when time-saving is necessity.

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VOL. IX

NEW YORK, AUGUST 25, 1919

NO. 24

TRANSCONTINENTAL AERIAL DERBY BEING ORGANIZED BY AERIAL LEAGUE

OVER \$100,000 IN PRIZES

PLANS for a Transcontinental Aerial Derhy, from New York to San Franscontinental New York to San Fransco, with over \$100,000 in prizes, with a first prize of \$20,000, have been announced by Captain mittee of the Aerial League of America, and donor of the Gilden Aeropane Efficiency Trophy.

The Transcontinental Aerial Derhy will be held under the auspices of the Aerial League of America and will be sanctioned by the Aero Club of America under the rules of the International Aeronautic Federation, which govern all aerial International Aeronautic Federation, which govern all aerial

sporting events.

The Derby will be international in character and will afford

supreme test to the aeroplanes and motors entered. So as to test the efficiency of different types of aeroplanes for touring and everyday transportation, and create maximu public interest in the contest, the race may be in legs of 250

minist interest in the context, the race may be in teles at 2.00 miles each with a compulsory stop at the end of each let miles according to the context of the context of

This is to be decided by a committee of aeronautic experts who will consider the matter from a practical standpoint. This committee will also define the handicaps to be placed on different classes of planes.

It has been proposed that the results in this contest be figured by the point system, allowing points for the records made by each aviator for each leg of the race. This will give

equal chances throughout the contest to all the aviators. The United States Army, Navy and Aerial Mail aviators will be invited to participate in the Derby. Captain Glidden will go to Washington to interview Army, Navy and Postal

authorities, and extend them the invitations to participate. The date of the Derby will be announced after conferring with the Washington authorities, aircraft manufacturers and owners of aeroplanes,

A committee is to be appointed by Rear Admiral Robert E. Peary, the President of the Aerial League of America, to have charge of the work of establishing landing places at intervals of fifty miles across the continent, along the Woodrow Wilson Airway.

FUTURE OF AERIAL TRANSPORTATION IS TREMENDOUS. SAYS FRENCH AUTHORITY

PiGURES regarding the tremendous interest existing in civilian aviation all over the world were given by Monsier Maurice de Saint Blancard, the Secretary of the Aero Club of France, and one of the highest aeronautic authorities, who arrived on "La France" and is the guest of the Aero Club of America at the clubhouse, No. 297 Madison Avenue.

M. de Saint Blancard stated that European countries are lanning extensive aerial mail lines, and that France, England Italy, Belgium and Spain are planning to establish aerial mail

naily, Beigium and Spain are planning to establish aerial mail and aerial transportation lines to their African colonies. "Successful flights have been made," said M. de Saint Blancard, "from: France to Africa, from Italy to Africa, from England to Africa and to India, and have demonstrated the practicability of establishing aerial lines which will be economically practical besides cutting down the time of transporting mail and express to one-quarter of the time required by land and water transportation. Practically all the French, British and Italian manufacturers have produced aeroplanes fitted with cabins which permit air travel with comfort."

There is going to be, also, the employment of large dirigibles for aerial transportation on an extensive scale,

Over one million dollars has been offered in different countries for prizes and other aeronautic purposes, as follows:
(1) The British Government is offering prizes amounting

to \$320,000 for aeroplane competitions to develop safer aeroplanes.

(2) The sum of \$400,000 has been given to the Aero Club of France by Henry Deutsch de la Meurthe.

(3) Prizes amounting to over \$100,000 are to be offered for the transcontinental competition being organized by the

Acrial League of America.

(4) The French newspaper, "Echo de Paris," has given \$60,000 for prizes for a 2,500-mile circuit race.

(5) The French newspaper, "L'Avenic," has given \$20,000

for cross-country contests.

(6) \$50,000 has been offered in prizes to the first Australian

pilot who flies from Great Britain to Australia.
(7) The London "Daily Express" has offered \$50,000 for aeroplane demonstrations establishing aerial communications on a commercial basis with India and South Africa, the machines entered being required to carry at least one ton of cargo.

- (8) A prize of \$32,000 has been offered for the first Portuguese or Brazilian aviator who flies from Portugual to
- (9) A \$50,000 prize has been offered by Thomas H. Ince for a trans-Pacific flight.
- (10) A \$25,000 prize has been offered by Raymond Orteig for the first flight from New York to Paris,
- (11) A \$2,000 trophy has been offered by Captain Charles J. Glidden for the Glidden Aeroplane Efficiency Tours, to be completed for under rules similar to the Glidden Automobile Tours, which did so much to bring about the use of automobiles for pleasure and transportation.
- (12) A \$5,000 prize and other prizes have been offered for the international marine flying trophy race, for the best speed over a distance of 200 miles, to be held in England in Sep-

M. de Saint Blancard stated that a number of long-distance aeroplane and dirigible flights were being planned in Europe, including a flight of 20,000 miles by the famous Italian poet, Gabrielle d'Annunzio, who plans to fly from Rome to Tokio

All the above mentioned contests are to be held under the rules of the International Aeronautic Federation and to be

popen to all policy loding the Policy Certificate of the Federa-tion, which is issued in the United States by the Aero Club of America, 20° Madison Avenue, New York City, New York, M. de Saint Bancard states that the Aero Club of France, which holds the International Aviation Trophy, which was won at the Chicago race by Jules Vedrine in 1912, was anxious to hold a competition this year, but found it impossible to hold a competition this year, but found it impossible to organize this competition owing to the fact that no competitions could be held in France prior to the signing of the l'eace Treaty.

SANTOS-DUMONT TO HEAD PAN-AMERICAN AERONAUTIC DEVELOPMENT

SEES VAST POSSIBILITIES IN LATIN-AMERICAN REPUBLICS FOR AMERICAN AIRCRAFT CONSTRUCTORS

A LBERTO SANTOS-DUMONT, the famous Brazilian inventor and aeronaut, who huilt and piloted ten dirigibles and several aeroplanes from 1898 to 1910, has arrived in the United States and is the guest of the Aero Club of America.

Mr. Santos-Dumont returned to the United States from South and Central America, where he has been travelling as Chairman of the Committee on Pan-American Aeronautics of the Aero Cluh of America, studying the possibilities of aerial

transportation.

Mr. Sautos-Dumont's report is not yet available, but it is understood he found South and Central America ready for extensive aeronautic development and that everyone of the Latin-American republics are anxiously awaiting the establishment of aerial lines to solve difficult problems of trans-

It will be recalled that Mr. Santos-Dumont came to the United States from France in 1915, at the request of the Aero Club of America for the special purpose of heading a committee entrusted with the possibilities of establishing aerial transportation in South and Central America.

After studying the aeronautic situation and the possibilities

of building larger aeroplanes for nearly a year, he started on his mission, which took him to the different Latin-American Republics. He attended the Pan-American Aeronautic Con-Republies. It altended the Fan-American Aeronaunt Courses at Santiago, Chile, in March, 1910, where the Pan-American Aeronaunte Federation was formed, and where he was made Honorary President. From there he travelled through different countries studying the subject, and when the United States entered the war, and Brazil declared war against Germany, he went to his native country, where he was placed in charge of important aeronautic work in developing the Bra-

zilian Army and Navy Air Services.

The Committee on Pan-American Aeronautics of the Aero lub of America includes Alberto Santos-Dumont, Chairman Henry Woodhouse, Vice-Chairman; Rear Admiral Robert E. Peary, Captain Charles J. Glidden, Charles Jerome Edwards and G. Douglas Wardrop.

Mr. Santos-Dumont is very enthusiastic concerning the narket for American aircraft in our sister republics of the Western hemisphere. He says:

"Only one who is familiar with the economic and sociologic problems of the South and Central American nations can realize what aerial transportation will mean to them, and can understand the tremendons commercial and sociologic development and change to follow as the result of the application of aircraft to transportation. As has been pointed out, building railroads would cost between \$100,000 and \$200,000 per mile, and years of time, and the subsequent cost of upkeep and maintenance would far exceed the prospective income from countries of such sparse population. On the other hand, the sum of \$100,000 would establish an aerial line across a distance of at least 500 miles, or more, where rivers or lakes can be used as landing places for aeroplanes."

While the Pan-American aeronautic movement is youthful, having been conceived by Mr. Henry Woodhouse in 1911 and evolved by him and the other energetic and farseeing men, who are responsible for so many important aeronautic move-ments-Messrs. Alan R. Hawley, Alberto Santos-Dumont, John Barrett, and Rear Admiral Robert E. Peary-it is ad-

vancing in gigantic strides.

The Pan-American Aeronautic movement is based upon the work of pioneers, some of whom were contemporaries of the earliest European experimenters in aeronantics. Brazil, for instance, rightly claims among its pioneers Bartolomeo-Lau-renco Gusmao, who takes us back to 1709, and Augusto Severa

SAllerro Sautos-Dumont, the Brazilion inventor and pio-neer, was the first man to really go where he liked in an ar-craft, which he did with his dirigibles in 1901, and the first man to fly an aeroplane outside of the United States, as well as to make a flight in public. He had been a pioneer in cycling and automobiling, and together, spent an eutormous amount, probably over a million, in developing cycling, auto-mobiles and aeronautics. In aeronautics he spent over \$30,000 a year for twelve years in experimentation. For his substantial support to automobiling he was made an honorary mem-ber of the Automobile Club of America.

Australia Appropriates \$1,500,000 to Aid Commercial Aeronautics

Australia has noted with interest the development of com-mercial aeronautics in the countries of Europe and through-out the United States and, feeling that success is assured, has decided to establish a department of her own. For this purpose an initial appropriation of \$1,500,000 has been made by pose an initial appropriation of \$1,500,000 has been made by the Government and the assurance has been given that more than the control of the control of the control of the control availation in Australia is established. The present appropriation will be used for construction alone, and as the department expands larger sums will be awarded for the purpose. In returned war availator, Australia has the nucleus for a

training corps, for these men are ready to serve their country. They will be asked to assist and direct the construction of the merchant air fleet and to instruct the pilots and ob-The argument is advanced that the returned war fliers will obtain employment in this manner and at a rate of remuneration higher than in other commercial pursuits.

The transport of mail by aeroplane in the United States

has been noted here, and the backers of the new movement assert that results in Australia will be greater than in America. In the United States, they point out, there is an excellent system of railroads and the transportation of mails always is speedy, but the aero delivery is faster. In Australia the rail-road system is not so good, and the chances for the aero

post to better the work of the railroads is infinitely better.

Transportation of passengers in countries of Europe has been the object of interest in Australia and the same argument is advanced that if it is a success there it cannot fail here. Later freight transportation will be taken up, provided. of course, that air delivery of mail and transportation of passengers proves successful.

passengers proves successful.

At present the Government is the only organization interested in the development of commercial aviation here, but
later it is expected that private capital will be attracted and
that Australia will have a perfect system of aerial transportation for mails, passengers and express.



THE NEWS OF THE WEEK



Caproni Makes Record Flight from Day-ton to Houston

Houston, Tex.—After being delayed for many days until Ellington Field was in suitable condition for landing the three Liberty-motored Handley-Page, a record flight between Dayton and Houston, 1,450 flight between Dayton and Houston, 1,450 miles, was made in a flying time of 17 bours and 15 minutes. The first Caproni to negotiate this trip took sevenly-eight minutes longer to complete the journey. Stops were made at Indianapolis, Belleville, Memphis, Roanoke and Dallas. Heavy rains held the plane for many days at some of these points, so that twenty-eight days were required to comtend the stop of the property of the prope piete the flight. One thousand and eighty gallons of gasoline, or an average of 2 gallons per motor per hour, were used in covering the 1,450-mile distance at 84 miles an hour. plete the flight. One thousand and eighty

Flight Saves Oil Man's \$250,000

Wichita Falls, Texas,-William Livingston, an oil magnate, narrowly missed losing \$250,000 when he found himself unable to attend a business meeting at Wiehita Falls. He received telegraphic advice at Fort Worth to come to Wichita

Falls, but missed the last train.
Captain Will Erwin volunteered to take Livingston in his aeroplane. The trip was made at a speed of 119 miles an hour, After the deal was consummated, Mr. Livingston purchased Erwin's aeroplane and hired his services. Since then he has been making his business trips throughout Texas by aeroplane.

New York State Motor Federation Urges Municipal Landing Fields

Uties, N. Y.-According to an announcement made by Mr. John M. Ross, of the New York State Motor Federation, efforts will be made by that body to secure the establishment of municipal landing fields and the establishment of emergency landing places through the cooperation of property holders, as well as the passage of laws to assist aerial travel.

Captured Aviators Held for Ransom

El Paso, Texas,-Licut. Paul H. Davis and Lieut, Harold G. Peterson have been and Lieut, Harold G. Peterson have been captured by Villista bandits after a forced landing on Mexican soil, and are being held for a \$15,000 ransom. The War De-partment is complying with the demand

of the outlaws.

An official statement was issued by Brigadier General James B. Erwin, District Commander, that Major L. A. Walton commander of the aero unit at Fort Bliss, had received a message from Peterson, advising the payment of the ban-

Lieut, Peterson was long stationed at Ellington Field, where he became known as one of the most skillful and daring exhibition fliers.

Aeroplane Delivery of Surgical Instrument Saves Patient

ette, president of the Philadelphia Aero Service Corporation, and Paul F. Houser, formerly military aero instructor at Mineola, was engaged as pilot.

Elizabeth Constructs Air Markers to Guide Commercial Fliers

Elizabeth, N. J.-Official air markers for the guidance of airmen piloting passenger and commercial aerial transports of the future over Elizabeth, N. J., will be located in Wilson Park, near the Newark line, it was announced after a con-ference between Mayor Mravliag, Board of Works Commissioner Hand, Abe J. Davis, president, and Major D. Griffith, secretary of the Chamber of Commerce, and others interested in civil and city im-

The air markers as designed are three wooden or concrete structures, thirty feet wooden or concrete structures, thirty feet in length, and will designate Elizabeth as Station J-78 on the air line route. These will serve as guides to direction and identification marks for the air pi-lots. The park will also be made available to the pilots as an emergency landing

New York-Cape May Passenger Service

New Iork-Cape may Fascenger Cape May, N. J.—A passenger air service between Cape May and New York is being established by D. A. Steele. City officials have given permission for landing the scaplanes of the projected service on the beach. A fare of \$100, plus war tax, will be charged.

Aerial Mail Delivered to Adriatic at Sea

New York, N. Y .- The first aerial mail Acw YORK, N. Y.—Ine first acrial mail delivery to a ship at sea was accomplished on August 14 when an Aeromarine flying boat dropped a sack of European mail on the deck of the White Star liner Adriatic. The feat was accomplished successfully in adverse weather conditions by means of an ingenious releasing device devel-

oped by the engineers of the Aeromarine Plane and Motor Company. The experi-ment was an official test undertaken at the request of the Postoffice Department, and may be put into general operation. Shortly after the experiment, David Lindsay, of the White Star Line, an-nounced the steamship companies would adopt the scheme also for delivery of ships' manifests after the ship has left port. In this manner, he said, fully eight-een hours can be saved to transatlantic liners. The liners will be able to take on

cargo up to the last moment before sail-ing, and then receive the completed manifests by aeroplane delivery long after they have sailed.

The mail delivered to the Adriatic was placed aboard the flying boat at the Co-lumbin Yacht Club on the North River. The mail sack was inclosed in a special

Piloted by C. J. Zimmerman, the flying boat arose off the yacht club landing and made a speedy flight down the bay. With Zimmerman was his mechanic, Richard Greisinger.

The flying boat overtook the Adriatic just as she was passing out of the Ambrose Channel. After circling around the liner a few times, Zimmerman came down

tiner a few times, Zimmerman came down to within fifty feet of the ship's masts and dropped the mail bag. A steel cable had been stretched be-tween the peaks of the Adriatic's fore and main masts specially for this experiment. On the flying boat a flexible cable, 200 feet long, suitably weighted at one end, had been attached to the mail bag. A special form of shock absorber was included in this cable in order to lessen the tremendous shock expected from the

the tremendous shock expected from the landing of a 100-pound mail sack.

As Zimmerman came down he released the free end of the flexible cable. Then, carefully judging his distance, he drove his aeroplane straight across the ship's course. As the flying boat cut across the hiner's bows the cable, which was the inner's bows the cable, which was dangling out at an acute angle in the wind, struck the wire stretched between the ship's masts, instantly becoming en-tangled in it.

As the aeroplane sped on Zimmerman released the mail bag, which flew out in a straight line until its cable stood out taut. This brought the shock absorbers taut. This brought the shock absorbers into play, and they checked the descent with great success. The bag fell into the water alongside the Adrianic, but as the other end of the flexible cable was tightly caught in the steel wire between the masts it was an easy matter for the sailors to pull it aboard.

Immediately afterward Captain J. Ran-som, of the Adriatic, sent the following wireless to the White Star Line offices

here: "First

here:
"First aerial mail delivered safely
aboard at 2 p. m. Ransom,"
Fully 300 passengers erowded around
the promenade decks of the Adriatic and
watched the experiment. Their cheers watched the experiment. Their cheers echoed down the bay as the bag was successfully hauled aboard.



The U. S. Aerial Mail Boat, which dropped mail aboard the Adriatic several hours after she left

Airship Service to Link Britain and

Central Europe Next Year The Hague.-Plans for the new era in the aviation world, so long prophesied by the linking up of the whole of Europe by a network of services, are beginning to a network of services, are neginning to take concrete form, according to a cable dispatch to the New York Times. Holland, it would seem, is about to be-

Holland, it would seem, is about to be-come the connecting link between the Allied and Central European countries. The first aviation exhibit in Amsterdam has certainly helped the plans to take

nas certainin incipent the piants to tack definite shape. Vickers, Ltd., has just announced a combination of passenger and mail ser-vices which will help form the links of an aerial chain from England and France through Central Europe. The first service will be between London and Flushing by means of a Vickers flying boat. From Flushing, and in connection with the London service, there will be services all London service, there will be services all over Holland by Vickers-Vimy commer-cial aeroplanes to Rotterdam, The Hague, Maastricht, Amsterdam and Northern Holland. There will also be a circuit from London to Paris, Brussels and The Hague

Another service in the preliminary stages will be started via Arnheim, Germany, to Central Europe, probably con-necting with Berlin. There is a possi-bility that this service will connect with a Zeppelin service beginning at the end of August from Berlin to Friedrichshafen, connecting with Swiss steamboats on Lake Constance and landing at Munich on the way. For this a new type of commercial airship built since the war will be used.

The capital for the network of aviation services will be \$5,000,000, partly Vick-er's capital and partly taken in Holland. There is little Dutch competition, as the Dutch have practically no airship facto-ries. They had no material for this purpose during the war and even most of the machines for the Dutch Army came from Germany, the parts being put together here.

Complete organization of the new plans is expected to be ready at the beginning of 1920. Handley-Page, Limited, has an-nounced regular service between Amsterdam and London, beginning next

The Vickers manager in Holland ex-pressed great surprise that America was not represented at the Amsterdam exhibition

Taxying Seaplane Beats Fast Motor Boat Atlantic City, N. J.—Earle Ovington, piloting a Curtiss "Seagull," won out in pnoting a Curtiss "Seagull," won out in a surface race against the speedy Nymph II, owned by Louis Eisenlohe, of the Chelsea Yacht Club, the Redskin, the Teaser, and other well-known speed boats of the vicinity.

Racing from a standing start, the seaplane was outdistanced by the Nymph and Redskin at the opening of the unique and Redskin at the opening of the unique contest, first official event of the kind in the history of yacht racing, because of the caution which Mr. Ovington had to exercise in keeping on the water. Dis-qualification was the penalty for flying.

When his marine competitors had gained a 50-yard lead the airman began to pick up and on the homestretch passed the Redskin. The seaplane worked up to even terms with the Nymph by the time the Judges' buoy was only a half-mile away, and they came down in sight of the crowd nose and nose. Carefully guaging his distance Ovington opened up with a hundred yards still to go and won by nine seconds over the Nymph. So close had Ovington figured out how far the seaplane would travel at its finishing speed before leaving the water that he had not gone ten feet over the finish line before it took to the air. It was a fitting climax to the fine program that had been pleasing the crowds all the after-

Cotton Plantations Inspected by Aeroplane

A plane has just been put into commis-sion at the head offices of Goodyear Tire and Rubber Co.'s cotton plantations, at Phoenix Arizona, to enable the overseers to keep in closer touch with actual farming operations on the plantations.

In the aeroplane the manager of the two plantations, which are situated about 40 miles apart, each about 20 miles from the city, can reach either plantation in 15 minutes. Formerly it required nearly an hour to reach them, because of the ad-

verse road conditions prevailing. The plane is in charge of Lt. O. P.

Johnson, a Goodyear employee who be-came an "ace" with our flying forces in France, his operations having been chiefly in and around Cambrai and Amiens.

This new method of permitting quick personal oversight of cotton-growing opcrations has many advantages over the former method of transportation by automobile. Recently a complete inspection of the 35,000 acres contained in both planta-Recently a complete inspection of tions was effected in less than one and one-half hours.

The Goodyear Plantations are located in the Salt River Valley. The cotton grown in this valley is of a superior quality. During the war much of the cotton from this section was used in making wings for aeroplanes, although the greater portion of it found its way into automobile tires.

Passenger Service in Rhode Island Newport, R. I.—A passenger-carrying service between Bristol and Newport has

been inaugurated. The flying boat only takes a half hour for the trip. Several trips were made on the first day.

Exhibition Air Battle Thrills Boston

Exhibition Air Beutle Theilla Boston Crowds
Nantasket Beach, Mass.—The thrilling statle in the clouds, which has been exhibiting here for some weeks, has attracted large crowds from Boston and nearby cities. The battle, involving all is earried on daily by Lieut. Howard C. Brown and Lieut. Wesley L. Smith. A 3000-foot paractute jump is made daily by Sergt. Murphy from a plane piloted by Lieut. Mark. C. Hogue, director of the exhibition team. The night flight, involvements and bombs. is particularly well re-works and bombs. is particularly well re-works and bombs. is particularly well. works and bomhs, is particularly well re-ceived. The enemy plane, picked up by the searchlight, is downed in a flaming spiral dive, after the maneuvers of comhat have been gone through.

Aeroplane Landing Field for Beaumont, Texas

Beaumont, Texas.—An aeronautical Club is being formed here for the purpose of establishing a landing field for aerial mail planes. The Retail Merchants' Association is assisting in the formation of the club, and the city has voted a tract of land to be utilized as a landing field.



rican Pathfinders, commanded by Liout. K. C. Leggett, in the transcretting flight Group of officers and men who are accompanying the All-Ame



TDADE DEVIEW



Duesenberg Engines to Be Made in Rochester

New York.—Announcement was made here by the Duesenberg Motors Corp. that the Rochester Motors Co., Inc., Rochester, N. Y., had acquired all manufacturing and selling rights of the Duesenberg designed and Duesenberg type automobile motors. Production already has of G- engine, known as the Rochester-Duesenberg, as a development of the Model G engine produced by the Duesenberg company early in 1918, having a rating of approximately 75 hp.

Sidney Waldon and E. H. Sherbondy Designing Light Car

Detroit. — Sidney Waldon, formerly vice-president of the Packard Motor Car Co., and later colonel in the Aviation Section, and E. H. Sherhondy, former experimental engineer of the control of the contro

Commercial Aviation in Central New York

Utica, N. Y.—Commercial aviation has come to Central New York to stay. With aeroplane corporations operating in Abany, Schenectady, Utica, Binghamton, Debay, Schenectady, Utica, Binghamton, Schenectady, Utica, Binghamton, Parkettan, Paradically every principal fair in New York State this fall air in New York State this fall air in New York State this fall are in New York State this fall following fairs: Gouvenur, Lowville, Boonville, Watertown, Ogdensburg, Machoplane Corporation, at arranging extension of the New York State of the New York State (New York State), The York Stat

There are now three base fields under operation by the Mohawk Valley Aero-plant Corporation, which began business this spring on a \$30,000 incorporation basis. The concern has the Glenn D. basis. The concern has the Glenn D. Beach where a hangar is to be built this fall, and the Virkler Field at Lowville. The corporation also has the use of the Smith Field at Herkimer and emergency landing fields at various points throughout the central portion of the state. These out the central portion of the state. The point of the think the state of the point of the state of the point of the state. The point of the state of the point of the state of the point of the state of the point of the state. The point of the state of the point of the state.

Lawson Has Co-operation of Spokane Chamber of Commerce

Spokane, Wash.—The Chamber of Commerce here announces that it is cooperating with the Lawson Aeroplane Company in its project of a transcontinental passenger aeroplane service.

Bills to Simplify Patent Procedure Framed

Washington, D. C.—The Patents Committee of the Engineering Council has collaborated with the similar committee of the Cational Research Council in decided of the National Research Council in decided of the method of dealing with patents in this country. The staff of the Patent Office is itself actively engaged in this control of the report personal patents of the Patent Office is itself actively engaged in this fort. Out of the report patent by the National Research Council, and appeared to the Council as the report also of its Patents Committee, remedial legislation has taken Council as the report also of its Patents Committee, remedial height by the Patents of the Council as the Interior of the Council as the Interior or any other department, and to simplify the procedure of the courts with reference to assessment of damages or profits for infringement of the Council with reference to assessment of damages or profits for infringement of the Council and the Patent Office and salaries in the Patent Office and salaries in the Patent Office.

Flight Instruction at Speedway Field, Philadelphia

Philadelphia, Pa.—At the Speedway Air Field, the official flying field of the Aero Club of Pennsylvania, located at Warminater, the Philadelphia Aero Service Corporation has its first class in flying receiving instructions. For convenience in instructing, small classes of three members each are formed, the course consist-

in the section of the course consists of the course consists of 450 minutes actual actual work.

The class now at the field consists of Serret. Roy K. Musselman, late of the U. S. Army, New Holland, Pa.: Lloyd Consists of the Consists of

The students are under the instruction of Lieutenant Paul F. Houser, lately an Army Air Service Instructor. Curlos dual control. Under the instructor's directions the pupil is gradually allowed to assume control until he is competent to handle it alone. He is then permitted to handle it alone. He is then permitted before Official Observers appointed by the Aero Club of America. The following officials of the Aero Club of Pennsylvania will observe test flights and recommend the granting of licenses: Joseph A. Pennsylvania, Paul B. Huyette and Lient. Pennsylvania, Paul B. Huyette and Lient. Paul F. Houser.

"Ace" Plane in Flight from New York to Alabama

Montgomery, Ala.—The first of an order for ten "Ace" planes was delivered to G. Mason Perry at Montgomery, who

is the distributing agent for these planes in Alabama, Georgia and Florida, after a successful cross-country flight from New Work. The performance of the "New which is one of the first commercial aero-planes produced in this country, was most gratifying. Exhibitions were given en route at various avaiton fields.

Experimenting with Fire Extinguishers for Aircraft

Realizing that fire extinguishers of the curhon tetrachoride type are ineffective for aircraft in flight, extensive experiments are being conducted to design an continuous of flight. If the continuous contraction of flight is present understand now used on aeroplanes depend upon the formation of a gas about the fire which cuts off the coxygen supply. Although this type of instrument is useful to fit on a plane for use when it is on the ground viously cannot function properly when the plane is in flight.

the plane is in flight.

The Fyr-Fyter Company of Dayton,
Ohio, makers of high-grade extinguishers, are conducting extensive experiments
with a view of producing an extinguisher
which will be a protection when the plane
is in flight.

White Sport Monoplane Uses Motorcycle Engine

Los Angeles, Calif.—The George D. White Co. of Los Angeles, is manufacturing a small sport monoplane powered by a motor cycle engine. The plane is of tractor monoplane type with a wing spread of 23 feet, length 14 feet, weight loaded 300 pounds. The maximum speed with 18 hp. is 50 miles per hour and the flight rance 150 miles without re-fueling. The fuselage is not of the usual wire.

The fuselage is not of the usual wire truss type, but is braced rigid with steel tubing so there is nothing to slacken and get out of line in had landings or rough usage.

The elevators and rudder are connected with steel tube shafts and no wires or cables are used. The rudder is of the balanced type for easy control and the control of the elevator is equally simple with all non-essential parts eliminated.

The elevator is in one piece with the rudder above and not split and in two sections as when the rudder is inserted between. The machine is built very low with the wheels attached direct to the fusedage hottom. The spring wheels take all the landing shocks and have none of the disadvantages of V type landing gears in tabler cord which rots and deteriously the state of the state o

The motor is an 18 hp, air-cooled Harley-Davidson or Powerplus Indian white turns over from 2,100 to 3,000 revolutions per minute. The Simes propeller is connected with a countershaft and is a slow speed type with a high pitch, allowing maximum power from the motor at an efficient speed, of the blade.

Although the monoplane is manufactured complete and equipped with 18 h.p. motors, motors of less power have been used successfully including Indian, De Luxe, Harley, Excelsior, Pope, Henderson and others.



Praeger Addresses Dixie Highway Association

Demopolis. Ala .- Mr. Otto Praeger, Demopolis, Ala.—Mr. Otto Fraeger, Second Assistant Postmaster General, addressed the Dixie Overland Highway Association at its Sixth Annual Convention, held at Demopolis, Ala. Mr. Praeger stated that the aerial mail service has covered <u>272608</u> letters since its inception fifteen months ago.

To-day eight Post Office Departments mail planes cleave the air daily each carrying between 13,000 and 15,000 letters and traveling rain, blow or shine 1,000 miles each day.

The work of the Post Office aerial mail system, Mr. Praeger stated, demonstrates the possibilities of commercial aviation and the regularity with which schedules

can be maintained.

"Let me cite a few instances," said Mr.
Praeger, "in which the Post Office Department has contributed directly to the advancement of aviation. We have demonstrated the possibility of maintaining a

dependable daily schedule by aeroplane the year round despite the assurances of so-called authorities to the contrary. have encouraged men with promising de-vices when no other branch of the Government would lend them a helping hand,

"Through the encouragement given an inventor by the Post Olinec Department an improved compass is now in general use by aviators. This compass is a significant departure from the early aeroplane compass which was hopelessly useless at times because of the great tendency of the compass card to set up a spinning motion. The first of this better type of compass was built specially for air mail planes and was first used by the Post Office Department.

were encouraged an inventor, who got no assistance elsewhere, in the develop-ment of a self-cleaning spark plug and one which would not crack or fuse in a high compression Liberty motor. That type of plug was developed on the air mail field at Washington and tried out and perfected on our air mail planes.

There are several makes of such plugs now on the market.

"At the request of the Air Mail Service the Burcau of Standards started to work on a device to locate or spot accurately a landing field by sound at times of utter invisibility and that Bureau has invented and perfected a device that will canable an aviator blindfolded to locate unerringly the center of the field on which he is to land. This wonderful achieve-ment of the Bureau of Standards has been accomplished on our air mail field and with the air mail planes.

All of the planes in the Air Mail Ser-All of the planes in the Air Mail Ser-vice are being made safe against fire by completely isolating the engine and gaso-line compartment by absetsos fire walls, each compartment protected by pressure fire extinguisher system, and the mail it-self is being safeguarded by non-inflam-mable canvas bags.

In concluding, Mr. Praeger urged opposition to any change in the administration of the air mail service which would subordinate it to a military organization.

UNITED STATES POST OFFICE

AIR MAIL SERVICE—EASTERN DIVISION

Monthly Report of Operation and Maintenance JUNE, 1919

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Aeroplane No.	Casoline	Grease and	Office Force	Motorcycles. Telecto	Rent. Light. Power. These and Water	Miscellaneous	Pilote	Mechanics and Helpers	Repairs and Accessories	Interest on Intrestment	Departmental Overhead Charge	TOTAL	Callens of Casoline	Total Time Run	Total Miles Run	Miles Run per Callon of Casoline	Cost per Hour	N. S.
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Total.	\$1.896.03	\$ 551_11	81.451.40	\$995 98	\$442.57	\$1,449.09	\$2,351.68	\$2,963.70	\$3,912.65	\$1,793,66	2506 88	\$18,586,75	6456	335 14	24289	3.76	\$55.44	\$.77

Major General Sir Frederick H. Sykes, K.C.B., C.M.G., Controller General, Civil Aviation.

Major General E. L. Ellington, C.B., C.M.G., C.B.E., Director General Supply and Research.

Gereard Hoggineers, Vickers Co., Ltd.
Captain P. D. Ackland, Vickers Co., Ltd.
Captain P. D. Ackland, Vickers Co., Ltd.
Sir Percy Gerouard, Armstrong, Whitworth & Co.
Sir Samuel Waring, of Waring & Gillow, who is also interested in five other aeronautical companies in England. Mr. Holt Thomas, Aircraft Manufacturing Company.

General Sir W. S. Brancker, K.C.B., D.F.C., Aircraft Manu-

General Sir W. S. Brancker, K.C.B., D.F.C., Aircraft Manufacturing Ch., British and Colonial Airplane Co. Mr. British and Colonial Airplane Co. Mr. British and Comos Engineering Co. Mr. Handley Page. Handley Page Co. Ltd. Mr. Graham White, Graham White, Graham White, Graham White, Graham Colonial Co Mr. Leslie P. Langton, Black and Manson Insurance Under-

writers, who have specialized in aircraft insurance.

facture of aeroplanes and motors, were visited: facture of aeroplanes and motors, were visited:

Members of the Mission also visited the airship factory of
Armstrong, Whitworth & Co., located at Selby, and the dirigible aerodrome of the British Navy located at Pulham, where
they examined the R-33, which is a replica of the R-34, and

several smaller airships. The Mission's investigation in France included visits to a number of French factories and flying fields, and interviews

with the following gentlemen:

General M. Duval, Directeur du Service Aeronantique Senateur Gaston Menier, Chairman of the Comite Aeronautique au Senat.

nautque au Senat.
Mr. Pierre Etienne Flandin. Deputy, and former Chief of
the Organe Interallie a L'Aeronautique,
Commandant D'Aiguillon. of the Commission Interministerielle de l'Aviation Civile.
Commandant de St. Quentin, Chief of the Service de Fabrication de L'Aviation.

Mr. Louis Breguet, of the Breguet Co., and Compagnie des

Messageries Aeriennes.

Mr. Bleriot, of the Bleriot Co.
Mr. Maurice Leblanc, Bleriot Spad Co.
Mr. Kapherer, of the Societe Astru.
Mr. Bazaine, of the Societe Astru.
Mr. Bazaine, of the Societe Nieuport.
Mr. Maurice Farman, of the M. & H. Farman Co. Mr. Granet, Secretary of the Chambre Syndicale de l'In-

dustrie Aeronautique. Mr. Esnault-Pelleterie, President of the Chambre Syndicale de l'Industrie Aeronautique.

Mr. Maurice de St. Blanchard, Secretary of the Aero Club de France.

Comte de Libersee, former pilot and at present much interested in the development of civil aeronautics in France.

Among the factories visited were: Morane-Saulnier factory. Breguet factory.

Bleriot factory.

arman factory. Hispano-Suiza factory.

Renault factory.

All of which are engaged in the manufacture of aeroplanes

The investigation in Italy included interviews by representatives of the Mission with the following gentlemen:

Signor G. Grassi, Deputy, Ex-Chief of the Italian Aero-nantical Mission in France.

Colonel Guidoni, Italian Foreign Aeronautical Mission,

Admiral Orsini, Commander of Italian Aviation.
Captain Bursaglia, Chief of Staff to the Minister of Marine, Signor Peroni, Director of the Ansaldo Co. Signor Casatti, of the Caproni Co.

ignor Buzio, of the Macchi Co.

Representatives of the Mission also visited the following factories in Italy, all of which are engaged in the manufacture of aeroplanes, balloons and motors:

aeropianes, ca.
Pomilio Co.
Ansaldo Co., at Torino.
Caproni Co., at Milan.
Issotto-Franchini, which was shut down due to a strike. 1. One of the most important problems to he considered in the rehabilitation of the world's commerce, following the close of the war, is the development of aerial transportation for commercial purposes. Its one invaluable service, and that in which it surpasses all other means of transportation, is speed, that time-saving element which the world has always striven for, and for which America, with its great distances, has such serious need. Reliability, safety, economy, and those other qualities of transportation service which are of value, will steadly improve as the use of aircraft increases and experience accumulates.

2. It is as impossible to forecast the future of this new medium of transportation as it would have been to describe the speed, comfort and safety of the modern steamship at the time the first steamship crossed the Atlantic. It is safe to say, however, that in time it will become one of the great trans portation mediums of the world and will continue to offer the fastest and most direct means of transportation for persons, mail, and light freight, known to civilization. Its development is limited only by the perfection of the mechanical devices used, with which we are constantly becoming more familiar, is becoming more thoroughly understood each year,

3. It is equally difficult to determine the speed with which 3. It is equally similar to determine the speed with which this development will take place. In fact, this will be determined largely by the opportunities afforded to employ the brains of the engineer and the scientist on the problems involved, which in turn will be controlled by the financial resources available for such work. It is thought by some wellinformed authorities that the next five or ten years will see this new industry through its initial stages, and established on ons new moustry orronger its minual stages, and established on a self-supporting basis, providing it is encouraged at this time. Adequate support cannot be expected from private enterprise alone, and if no ourside add is given, ten years will probably see this industry in America still struggling for a footbold, and far behind its European competitors who will receive substantial aid of many kinds.

4. History has shown repeatedly that no nation can afford to neglect the highest possible development of its transporta-tion mediums, regardless of the opportunities existing for immediate profit to the private enterprise concerned. particularly true of aerial transportation, which is not local in its nature, but which is essentially of a national and international character, due to the great distances covered, and to the speed with which it links together far distant points. This principle has been so clearly understood that an international agreement has been established between the Allies and their associates, by which international flight of aircraft has been provided for in a far-sighted manner, thus making immediately possible the flight of private craft from one country to another on a basis as clearly defined by law as that governing the movement of steamships, except, of course, that the prac-tice of ages of ship travel is missing in the case of aircraft.

5. The development of aviation is progressing so rapidly at this time that it is difficult even for those in close touch with it to keep up with its progress. During the past two at this time that it is unrout even for those in crose tourn with it to keep up with its progress. During the past two months the Atlantic has been crossed four times by aircraft; first, by a sepalane of the American Navy; second, by a an aeroplane of Great Britain, and, finally, by an airship of Great Britain which has twice demonstrated its ability to first better than the control of the progress of the progr building in England which will be able to carry from five to ten tons of mail, in addition to the necessary fuel and crew, and cross the Atlantic from London to New York, in onehalf the time made by the fastest steamships. Who can say such transportation facilities will not greatly serve civilization and he of immeasurable value to our own country if properly developed and used?

6. Already lines of aerial transportation are being used in England and France in a small way for commercial purposes, but the distances in these countries are so short that relatively ittle advantage can be gained, so such ventures will develop slowly. A daily service from London to Paris has been in operation for some time, and promises to be quite serviceable as soon as it can be relieved of its war time military supervision. Other lines now in operation are from Paris to Lille and Brussels and from Paris to various points in Alsace-Lor-raine and German occupied territory. Among other plans raine and German occupied territory. Among other plans English private interests are projecting acroplane lines from Carro to the Cape and Can to the Markov and French interests are planning to run a line to Algeria and Morocco. The lines will carry mail, passengers, and express, and it is expected that they will materially shorten the time between European centers and their far distant terminals. The United ropean centers and their far distant terminals. The United States Post Office Department has carried mail by aeroplane from New York to Washington for over a year with a record of nearly one hindred per cent delivery at each end every day. It is now inaugurating a line from New York to Chicago which will shorten the mail time between these two points to about one-shall. It is also projecting a two-day service from New York to San Francisco. England is already desirons of organizing with the United States a transalantaci airship into for mail service which would give a five-day mail service from London to San Francisco. Such a service is entirely possible at this time, and its inauguration depends only upon adequate encouragement and financial amonor.

7. The risks involved in these ventures, due to unknown conditions of the atmosphere, imperfections of cupiument, etc. are still so great as to make them impracticable from the point of view of private enterprise, undertaken (or a profit. If left entirely to such private enterprise, aerial transportation will develop slowly and with many losses and backward steps, as did the stramship, the railroad, and the automobile, each of civilization. Creating the control of the control of

- 8. One of the striking features of our investigation in Europe was the unanimous belief that the use of aircraft in warfar and for national detense would continue to increase and that in the next war, whenever it implift come, aircraft would be a of the geatest military authorities in Europe stated that in his opinion the first lattle of the next great war would be in the art, and would very treatyl decide which side would win, in that the side winning in the air mould immediately that the side winning in the air mould immediately that the side winning in the air mould immediately that the side winning in the air mould immediately that the side winning in the air mould immediately that are side winning in the air and the mould quickly cripple them by air raids upon an enormous scale. The opinion was everywhere expressed that the development of aircraft for purposes of national defense must continue somethmust be maintained at all times to insure an adequate supply in case of need. Due to the complicated and delicate nature of such cupingment, to its rapid depreciation in use, and to its constant obsolvence, the expense involved in such a poece times.
- 9. The existence of an aerial transportation industry with a great commercial air fleet and of a strong production industry would greatly decrease the need for atteitly military equipment and recourses, in that practically all of the manifesturing and maintenance facilities and personnel employed by such commercial activities, would be available as a reserve in time of war. It is evident, therefore, that the most economical expectation of the commercial purposes, and thereby build up a commercial purpose, and thereby build up a commercial purpose, and thereby build up a commercial relativity small expense to the government, which is the of need. America's experience during the war has proven conclinively that aircraft facilities and technical personnel, and particularly production facilities and technical personnel, and particularly production facilities and technical personnel, continued experience and at great expense.

10. America's production industry reached large proportions during the war, but since the signing of the armistic it has shrunken to a very small volume. Unless immediate attention is given to its conservation, if will practically disapted in the conservation of the conservation of the conservation in its development will have been gient fruitlessly. This industry does not require a large volume of business to keep it alive and licality, but it does require a steady and dependable remain interest. Firstee capital and enterprise will not long.

Recommendations

Upon the basis of these conclusions, we offer the following plan for stimulating the development of commercial aviation as an aid to national defense, and as a response to the demand that is already developing for improved commercial transportation though the use of aircraft.

- A. The Civil Aviation Division of the National Air Service should establish with the advice of the Army and Navy, and the Divisions of Military and Naval Aeronautics, a series of flying routes throughout the United States and its possessions and to contiguous foreign countries, which will be of military and commercial value. It should also prepare and publish maps and descriptions of each of these routes, suitable for the use of fiers.
- B. There should be provided at national expense certain flying fields in strategic locations, and suitable for military purposes, and encouragement should be given to the various States and Municipalities to provide flying fields upon all flying routes, at points found desirable, thus eliminating the necessity for private ownership of flying fields except for strictly private use. Ilangars should be provided at each flying field by the govern-

mental authority owning the field (that is, Federal, State or Municipal), or where such fields are used constantly by private interests, they should be permitted to provide their own hangars immediate adjacent to and opening upon such flying fields.

The operation and use of such flying fields should be controlled by Federal law, so as to obtain uniformity throughout the nation and conformity with interna-

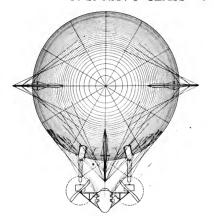
tional regulations.

- C.A. Obtain regulational flying fields should be equipped at national commence with signalling and communication systems, including wireless telegraphy, wireless telephony, and searchlights, to thoroughly safeguard and guide aircraft in flight. The Government's attitude in and shipping in its lighthouse and coast parties parties of the operation of signalling and communication equipment should be controlled by Federal law for the rea-
- D. A meteorological service should be developed to provide fliers and other availion interests with accurate weather reports and other atmospheric data necessary to govern their activities intelligencelly. The value of this service to commercial avaisation cannot be overestimated, as it will go far toward establishing reliability and safetys of service, just as weather reports are of immeasurable value to ocean and lake transportation.
- E. Training facilities should be provided at various localities throughout the country, either at Government resposes or by private enterprise under Government resulation, with guarantees from the Government of a guarantees could be given by the Government without undie expense if it used such schools for the prelimnary training of its military personnel. Sinch a plan its of the training of the personnel needed for commercial requirements, which personnel in turn should become a permanent reserve for military requirements one school for the teaching of aerodynamics and other branches of the science of aeronautica are recommended under the heading "Organization." Encouragement to extablish departments of aeronautical science.
- F. The Government should encourage the development of new design and aeronautical technique for commercial purposes along the lines recommended under the heading of "Technical Development."
- G. The Department of Aeronautics should maintain the elovest possible relations with all civitized nations in determining and applying the rules and regulations which will evern the international inc of aircraft, and with proper consideration a body of Federal law governing the use and air worthiness of aircraft for commercial purposes, which will safeguard life and propportation promote the commercial insect of earlst tensportation.
 - In order that commercial aviation may be helped and not hindered by such legal restrictions, it is of vital importance that aerial transportation be recognized at once as an element of interstate commerce and be made subject to one body of Federal law applications of the commerce and be made subject to one body of Federal law applications of the commerce and be made subject to one body of Federal law applications of the commerce and be made subject to one body of Federal law applications of the commerce o
- H. Insurance of aircraft and its personnel against all kinds of hazards and risks involved should be encouraged in every way. The cost of such insurance should be kept as low as is consistent with the risks involved.
- as low as is consistent with the risks involved.

 Liencouragement should be given to the organization of the control of payment for the carrying of mail and expressage, and of guarantees as to the volume of such business. Computer of the control of the control

Custarantees of this kind coupled with opportunity to insure against loss by accident should make privately operated transportation lines a commercial possibility, but if it is found that private enterprise does not restoud undertake certain transportation ventures on its should undertake certain transportation ventures on its own account and should continue to operate such lines until they are proven commercially successful. Ulti(Continued on page 1103)

U. S. NAVY CLASS "C" DIRIGIBLE



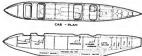
STERN

The C type is the largest of the naval coast patrol dirighbes. It was distance and duration record for American lighter-than-air craft by flying on May 14-15 from Montauk Point to Newfoundland in twenty-four hours and Jotty Lills statute miles. Unfortunately sike was lost from her moorings within a short time of landing at SL-Johantine 12-16.

The C type is 192 feet long, 43 feet wide, and 46 feet high; it has a capacity of 180,000 cuhic feet. Cruising speed, 42 M.P.H.; climb, 1,000 feet per minute.

The car is of streamline form, 40 feet long, 5 feet in maximum diameter, with steel tube outriggers earrying an engine at either side. Overall width of outriggers, 15 feet. Complete weight of car, 4,000 pounds.

The envelope maintains its form by means of internal pressure, obtained in the slip-stream of the two propellers through two blower pipes. These discharge into a duet leading to two bal-



CAR- SUIBOARD PROFILE

loonets. Two water hags fitted forward and aft in the bottom of the envelope aid in the trim control.

Longitudinal and latitudinal stability is obtained by fixed horizontal and vertical fins, and steering in the horizontal plane

by a balanced rinder.

The suspension of the car and tail surfaces is made by patches, some fifty finger patches, each tested to stand a 2,000 pound pull, being required to support the ear. Each patch consists of four strips of fabrie shaped somewhat like the spread fingers of a hand, which are sewed and cemented to the envelope.

mented to the envelope.

The power plant consists of two Union gas engines, water-cooled, of 6 cylinder vertical type, developing 125 horsepower at 1350 revolutions per minute. Less than ten gallons of fuel per hour are used at a flying speed of fifty interest and hour are used at a flying speed of fifty interest and interest and the speed of the property of the speed of the property of the speed of the property of the speed of th

hour. These dirigibles are equipped with medium range radio transmitters weighing approximately 250 pounds. The antenna is mounted inside the envelope and is insulated throughout to avoid danger from sparking. A trailing antenna may also be used.

also be used.

Seven passengers may be carried, but
the usual crew consists of four. At the
front, the oxswain is placed; his duty is
to steer the machine from right to left.
In the next compartment is the pilot, who
operates the valves and controls the vertical movement of the slip, and aft of the
pilot the mechanicians controlling the en(Continued on page 1098)

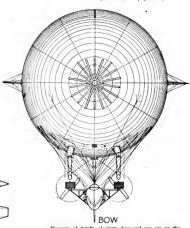
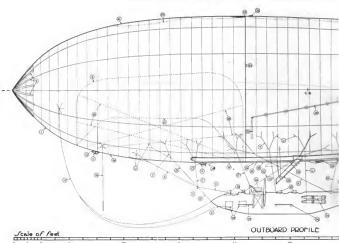
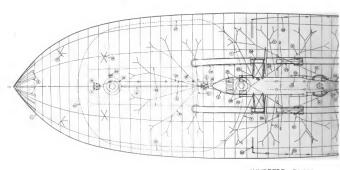


Diagram of details af stern, bow and car are on the same scale as the diagrams of profile and plan on pages 1096 and 1007

THE U. S. NAVY "C" CLASS NO.





INVERTED PLAN

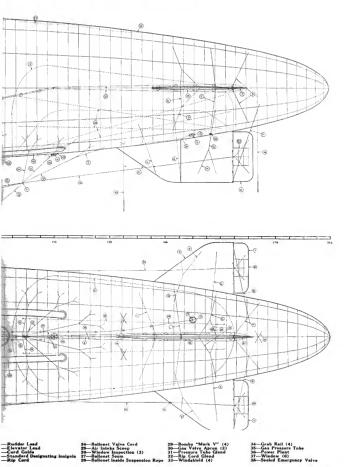
TABLE OF PARTS

4—Rip Panel (2) 5—Nose Batten 6—Rudder 7—Elevator (2) 8—Fin Vertical (1)





RIGID TWIN ENGINE DIRIGIBLE



(Continued on page 1098) gines. At the rear cockpit is the wireless

operator.

The general specifications of the C type dirigible follow:

C I Cl

General Characteristics
Length 192' 0"
Diameter 41' 9"
Volume(cu. ft.) 182,000
Total lift*(lbs.) 12,700
Furity, 98.6%. Temperature, 65 F. Barometer, 30.
(Lbs.)
Weight, empty 7,940
Weight carried:
Crew (6) men 1,015
Fuel 3,250
Oil 120
Navigating equipment 25
Radio 250
Food
Drinking water 85
Ballast
Lizeful land 4.780

Userui ioad	4
Endurance at 45 M.P.H.	47 hours 2,150 miles
Endurance at 55 M.P.H.	28 hours 1,540 miles
Maximum speed, 60 M.P.I. Maximum attainable heigh Total power (normal), 25 Engine type, Hispano-Suiz Engine number, 2.	t, 8,600 ft. 0 11.P.

Fuel consumption per hour, 150 lbs.

		Area							
								(.5	iq. ft
Vertical	rndder					,			1
Vertical	fin				٠.				3-
Elevator	(2) (t	otal)							11
Horizon	tal fin ((2)							4.
								((u. ft
Volume	forward	ball	001	iei	ıs.			Ċ.	26.5
Volume	after ba	lloor	ets				 i		26.47
Center o									

Theory of Sprung Tail Skids on Aeroplanes

It is claimed at the outset that attaching springs to the tail skid of an aeroplane is more important than it is usually obselved. The skid is attached to the sidered, the skid is attached to the interest of the skid is attached to the upper end connected with the body by a spring. The oscillations set up when the upper end connected with the body by a spring. The oscillations set up when the with the ground on landing are examined from a theoretical point of view. It is supposed for simplicity that the landing wheels are rigidly attached to the ground, wheels are rigidly attached to the ground he askle.

Let O be the point of intersection of the axle and the plane of symmetry, S the C.G., A a point on the fuselage vertically above the lower end of the skid, Also:

P = the reaction between the skid and the ground.

T = the moment of inertia of the machine about the axle of A.
G = the weight of the machine,

H and H' are the distances during oscillations above and below As. Suffixes 0 and 1 are used to denote the values of the quantities when the machine is in its zero fortion (i.e., when the skid just touches the ground, but does not bear the weight of the machine) and in its position of equilibrium respectively.

The equation of motion about the axle is $\frac{d^2\phi}{d^2\phi}$

$$Gr \cos \phi - Pr_s = -T \frac{d^2 \phi}{dt^3}$$

Consider the first oscillation between the

zero position and the lowest point reached by A.

If $x = \phi_0 - \phi$ and K a constant depending on the spring,

 $P = P_0 + Kr_{\bullet X_0}$ and it is found on integrating the equation of motion that



the car of a "C" type dirigible, showing mounting of engines and the blower pipes behind the

$$x/x_1 = 1 + C \sin a (t + t_0)$$
 where

and
$$c = \sqrt{\frac{Gr\cos\phi_s - Psrs}{Ts_1}}$$

$$C = \sqrt{1 + \frac{2Gh}{s_1(Gr\cos\phi_s - Psr_s)}}$$

where h is the vertical displacement of S corresponding to a rotation x. These equations give the maximum value of x, and hence

 $P_{max} = P_1 + (P_1 - P_2)C$. Now $Gh = P_1H$ approximately, and since the work done by gravity from zero to equilibrium positions is equal to the work done by the spring for the same motion,

Gr cos $\phi_0 x_1 = \frac{P_1 + P_0}{2} H'_1$, also $r_0 x_1 = H'_3$. After substitution, the final expression for

After substitution, the final expression for P_{max} are obtained, viz.: $P_{max} = P_1 + \sqrt{(P_1 - P_2) + 4P_1Hk},$

so that the maximum value of P that is likely to occur can be found if P_1, P_2, P_3, P_4 . And K be known. In particular, if $P_2 = O$ and H = o, i.e., if there be no previous tension in the spring and tail of the machine drops only from the zero position.

$P_{max} = 2P_1$.

The equation loses its meaning, of course, if the tail of the machine cannot fall through a distance H_{max} without touching the ground.

Now, substitute $P_0 = P_{mas} - KH^r_{mas}$ in the above equation for P_{mas} and solve for H, then

$$H = \frac{2H'_{mas}(P_{mas} - P_1) - kH'_{mas}}{4P_1}$$

$$H_{mas} \text{ will, of course, have to lie between}$$

limits defined in the design of the machine. The article includes the solution of a few numerical examples where also the length of the skid is considered, and concludes with a remark on the friction between the skid and the ground. (Oesterreichische Flug-Zeitschrift, December)

Aviators Aid Astronomical Investigations

1918.) No. 4555.

Arcadia, Calif.-The Smithsonian Astrophysical Observatory on Mount Wilson. under the direction of Mr. L. B. Aldrich, has made some valuable experiments with the assistance of the U.S. Aviation Service at Arcadia, Calif. A special instrument, the pyranometer, devised by Messrs. Abbot and Aldrich, measures the heat from the sun and sky combined, or from the sun alone, or from the sky alone, as it falls upon a horizontal surface. Mr. Aldrich used the pyranometer to measure the reflecting power of the large layer of for which often covers the San Gabriel Valley, lying between Mount Wilson and the sea. A military balloon acted as support for the pyranometer above the fog, and the results were very satisfactory. The measurements are of much interest to mereorologists in consideration of the temperature of the earth, which is to a large extent covered with clouds.



NAVAL and MILITARY AEDONAUTICS ^



Radio Telephone Concert for New York as All-American Pathfinders Start

New York, N. Y.-Uncle Sam's first aerial transcontinental recruiting expedition, known as the All-American Path-finders, started from Mineola, L. I., on August 13, and one of the nine aeroplanes in the squadron, equipped with the new wireless telephone system, sent a farewell

wireless telephone system, sent a farewell message and a Sonora phonograph concert from the sky as it passed over the city, to the people of New York.

Co-operating with the War Department, the Adams Aerial Transportation Company had a wireless telephonic re-Company had a wireless telephonic re-ceiving set erected in its offices in the Times building, with the aerials on the Rialto Theater. This installation was made by the International Radio Telemade by the international Radio Tele-graph Company, which conducted the receiving end of the unusual demonstra-tion. This company also furnished the Navy Department with the radio equip-ment used on the NC trans-Atlantic fliers.

A representative gathering of officers identified with the aviation sections of the Army and Navy, as well as many others prominent in the sphere of aviation, were present to hear the farewell message and music from the sky,

The aeroplane equipped with the wireles elephonic outht was piloted by Lieut. J. E. Adams, while Lieut. C. C. Shangraw was, the radio officer. Popular musical selections were sent and Lieut. Shangraw's appreciation of humor and topics of the day was demonstrated when he sent the following message: "I feel like a theatrical manager-I am way up in

The demonstration proved to be a complete success and will be repeated over all of the 171 cities and towns on the itinerary of this great flight from New York to San Francisco.

Forest Patrol Fliers Pass 50,000-Mile Mark

Mark
Washington, D. C.—The Director of
the Air Service announces that the five
forest fire patrols now operating from
Mather, March and Rockwell Fields have
covered a toul of 54,900 miles in 46,436
minutes during the seven weeks' period
ending on August 8. In that time 452,
flights were made and 91 fires discovered. The summary of the work is as fol-

WEEK ENDING AUGUST 9, 1919 Squadron Flights Miles Minutes Fir dather Field (Ore.) 28 1,670 1,680 28 dather Field (Cal.) 28 2,814 3,410 5 March Field (Cal.). 16 1,360 1,010 8 Rockwell Fld (Cal.) 7 2,686 1,791 t Total 79 8,530 Total for 7 weeks... 452 54,906 7,89t 46,436

Cross-Country Mileage Record Over 60,000 in Week

Washington, D. C .- The Director of the Air Service announces that a new record for cross-country flying was established during the week ending August 8. Army aviators flew 60.482 miles in that period. This mileage does not include flights given in the instruction of enlisted men.

Progress of the Dallas-Boston Fliers

Washington, D. C.—The Dallas-Boston fliers on August 10 had flown a distance of 4.211 miles in a time of 2,698 minutes. On that date a flight from Providence to Albany, 170 miles, was made in 90 min A flight from Providence to Hazelhurst Field and return for supplies was made on August 9, a distance of 300 miles in 168 minutes

1,000-Mile Inspection Flight in 760 Minutes

San Antonio, Tex.—Two DeHavilands, Lt. Leonard W. Jurden, pilot; Major Bruce B. Buttler, passenger; Command-ing Officer of Kelly Field; Lt. Rex Stoner, pilot, Commanding Officer 8th Aero Squadron, and Capt. W. G. Renwick made a flight to McAllett, Tex., on a tour of inspection. Total mileage, 1,000 miles; distance of both ships; time, 760 minutes; altitude, 5.000 feet.

Mechanics Required for Aviation Mother Ship

Mechanically inclined men who desire to go to sea will be accepted for service aboard the U. S. S. Shawmit, the only aviation mother ship in the navy. Lieu-tenant Myron F. Eddy, flight officer in charge of aviation recruiting in the New York district, announced that the Shawmut is releasing aviation mechanics in accordance with orders received recently, and that the vacancies will be filled by re-

The Shawmut acts as tender for ten The Shawmul acts as tender for ten scaplanes and will be attached to the At-lantic fleet. Four of the scaplanes are carried on board ship. The other six are known as air boats—big scaplanes of the F-5 type. Air boats are flown from neavers. The Shawmut will proceed to

Newport soon for aerial bombing practice and for seaplane observation of tornedo tests

99 Per Cent. of Air Service Equipment Ready to Use

Washington, D. C.—The following statement was issued by the statistics branch, General Staff, War Department: The latest reports from the Air Service show over 4,500 active type planes and over 15,800 active type engines at fields and depots, of which 99 per cent are in

and depots, or which by perfect are in condition to use.

In the following tables are shown the status of the planes and engines at the Air Service fields and depots as of June

30, 1919.	In	total in
Total		to use
Planes		
Experimental 346	346	001
Active 4,547	4.488	99
Obsolete 1,865	1.854	99
Obsolescent 2,670	2,544	95
W - A 0 138	0.313	
Engines 9,428	9,232	98
Active	15.788	99.8
(Wholete 2,865	2,822	98
Obsolescent 10,457	80,117	97
Experimental 993	945	95
Total30.138	29.672	98
Total30,[38	29.672	98

Aeroplane Stocks Officers' Club Despite Railroad Strike

Fort Sill, Okla,-The Officers' Club at Fort Sill used aeroplane transport when local meat supplies were exhausted durlocal meat supplies were exhausted during a recent railway strike. A flight to Oklahoma City was made to procure 125 pounds of meat and a quantity of urgently needed electrical supplies.

The Post Field Aerial Baseball Cluh were carried in Curtiss planes to and

from Marlow, Okla., in order to play a game scheduled there.



The crew of the Caprent biplane which made the successful flight from McCooh Field to Ellington Field. Left to right: Mechanic C. L. Wiggln, Lieut H. R. Harris, Mechanic Dave H. Cramer, Lieut. C. H. Wilcox and Mechanic Honger Wictum



FOREIGN NFWS



Eight Passengers in Paris-Morocco Flight

Casablanca, Morocco,—The giant aeroplane Goliath, carrying eight passengers, which left the vicinity of Versailles at midnight Sunday, arrived at Morocco on August 11 at 5:40 p. m.

Strong Air Force to Reduce British Expeditionary Forces

Strong Air Peres to Rebuse British Expeditionary Peres Landon—Mynino Churchili, in urgine strictest conony in regard to war expreditures, particularly in Sometica with the maintenance positions, and the properties and the properties are supported to the properties and properties are supported to the properties and properties are supported to the properties and aeropaleses to properties and aeropaleses to property reduce out or reduce the control grant and aeropaleses to property reduce out to reduce the control British corres by half.

It is a properties and the property has a property of the course of the property of the course of the property of the course of the property of

The estimated appropriation for the air force of £66,000,000 (\$330,000,000), the General added, was necessary to elear up war contracts.

D'Annunzie to Attempt Rome-Tokie Flight

Rome.—The Popolo Romono states that Gabrielle D'Annunzio will shortly start a flight from Rome to Tokio via Asia Minor, India, Tonkin and China. The flight is expected to take fourteen days.

Ban on Civilian Passenger Carrying Between London and Paris Lifted

Ban an Civilian Faseanger Carrying Setween London and Fatia Lifted Landon.—The Air Ministry amounts that:—

Landon.—The Air Ministry amounts that:—

Civilian Civilia

with, and carry, certificates of airworthiners, issued by their respective. Passorter will be carried by all civilian personnet.
A full list of passengers showing their destination will be carried.
No goods or merchandise may be carried.
It is to be clearly understood that during the week this temporary over Paris. in force, no machine will, in any erreminations, by over Paris.

3,700-Mile Tour in Aerial Limousine

Paris.—According to the Daily Express, Jean Galmot has completed a 3,700-mile trip around France in an aerial limonsine carrying six passengers. Many stops were made at historic points along the jonney.

The London-Brighton Week-End Service

London.—A regular week-end service between London and Brighton has been imagenrated by the Avro company, leaving London Friday and Saturday and returning Monday. The charge is £3 one way and £7 10s return trip.

Aerial Patrol Discovera Secret Meeting

Belfast—A scroplane making a "partol light" recently between Novan, on the east coast of Ireland, and Armagh, observed Sinn Feiners Anding a meeting which had been forbibled. The scroplane is the property of the property o

Paris.—Lieutenant Godefroy, a French aviator, performed, on August, the remarkable feat of passing under the Arc de Triomphe in an aero-Godefroy flew a machine.

the remarkance text of passing under the Are de Triomphe in an average of the Area and the Area

Schnalder Traphy Competition in September
The Jacques Schnelder international traphy, Jist won by C. Howard
Piaton in a Sopwith buly scaplane at Monte Carle in 1914, will be competed for on Wednesday, September 10th, at Bournemouth. The water
course will be over a circuit of about thirty miles, maring from Bourne
course will be 200 exactle and the september of the September 10th and th

25,590-Foot Altitude with Passenger Claimed as World's Record Paris—Maurice Walhaug, flying in an arcoplane with one passenger aboard, claimed to have established a world's record on August 9th by reaching an altitude of 25,590 feet (7,800 meters).

London Flying Club Has Auspicious Inaugural

London Flying Club Has Assoptious Issurgural
London, Fing.—The London Flying Club remay poper dis cishbouse. The London Flying Club remay poper dis cishbouse. The second of the control o

Royal Jewels to Sweden by Aeroplane

Royal Jawala to Sweden by Aeroplane
The Correlance corresponding to the Central News reports that the
police of Garage corresponding to the Central News reports that the
police of Garage Correlation of the Central News reports
ties stroped from an aeroplane and which they believe to be the property
of the former royal family of Saconty, from the aeroplane. They were
picked up by two Germans, who claimed the valuables as their property.
The police are investigating.

Mexican Air Service Growing

The Mexican Army Air Service has been gradually growing until it now numbers 500 aviators in various stages of training, while there are 6,000 applications on file, Colonel Alberto Salinos is chief of the Service.

Rice Growers of Colusa Employ Aeroplane Patrol

Rice growers at Coluss are contracting with a local company for an aerial patrol to protect 15,000 acres of rice from the ravages of ducks, geese and mindtens. It is helieved the regular flight of aeroplanes over the fields at low altitude will so frighten the birds that they will leave for

Details of Turin-London Flight

London-Parther deformation regerding the Turio-London Flight to Details of Turio-London Flight Completed on July Internation regerding the Turio-London Religionation Detection on July International Benaccini, in now available. The 225 mile disconnected by Lieutreauth Benaccini, is now available. The 225 mile disconnected to the Parther Complete Complet



A few early model Sopwith combat planes being made ready to start on a practice formation flight



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. M. Mahon

A STATE OF THE STATE OF



NOW that the Artial Age contests are over, the model flever of the United States should not let their morter of the United States should not let their morter models, both the racing type and the scale models, as we have promises from many influential men in the aircraft industry and other embusiasts, that they will offer prizes in the near future. This should be given due consideration together with the fact Artial Age will offer prizes again as soon as popular interests in models is proven by the model flyers themselves.

The rubber strand driven model has been the standard for The fubber strain curven mouer has need the standard for years, but like every other mechanical contrivance, the model acroplane must advance with the times and other forms of motive power should be experimented with and put to practical test to find something that will fly a model for at least

Many different types and kinds of motors other than ruhber bands have been tried; the best so far have been comrubher hands have been tried; the best so far have been compressed air and steam. Steam engines are complicated as to give purp arrangement must be so designed and timed as to the pump arrangement must be so designed and timed as to the pump arrangement must be so designed and timed as to the steam and used up in the cylinders. The pump penetrally pamps too much or not enough water, and the result is that the boiler gets cold from the excess of cold water, or it dries up in secount of not getting enough. However, many sucland, with good results. Mr. Grover is the leading steam engine builder in the model aeroplane game.

The compressed air motor is less complicated and while it works on much the same principle as the steam engine, it contests will have one event for engine drive models. Points

is easy to construct and far easier to operate. The next contests will have one event for engine driven models. Points will be awarded in proportion for the type of engine used, to the proportion of the type of engine used, tioned is out of reach of most model builders as it is ene-essary to have a lathe and other machine tools to manufacture it. The compressed air motor, on account of its simplicity, will be the most popular, no doubt, and the writer is in hopes that the existing record for a model powered with this

type of motor will be broken.

Four years ago the writer had the pleasure of successbelly fear's ago ine writer nau ine piesature or success-belly frying a model rising from the ground and sustaining the property of the property of the property of the cylinder compressed air motor and the flight was made at Highland Fark, Brooklyn, N. Y. Later flights of longer duration were made at Wading River, L. I., for the benefit of the Wading River Mig. Co., who purchased the rights to make and sell these motors.

As far as can be ascertained, these were the first success-As far as can be ascertained, these were the first successful flights in this country for models with compressed air motors. Later contests were held by the Aero Science Club of New York City, and records of 30 seconds were made with a model having a foreign engine.

The Wading River Mfg. Co. carries a full line of compressed air motors and plans for building. Their address can be found in the advertising columns of this paper.

To make a compressed air motor, it is necessary to have a sheet of .008" thick bronze 13" x 18" if wrapped straight, or 6" x 28" if wrapped spirally. This bronze is then wrapped around a former of wood and the laps of metal are soldered. Before putting on the ends, thin steel wire should be wrapped Detore putting on the ends, finn steel wire snown or wrapped around the outside every ½" to strengthen it, after which the end caps are soldered on. These end caps can be purchased at any hardware store. Simply ask for curtain rod balls 2½" in diameter and split them in half. The outside half is the one used. A bicycle valve is used for holding the pressure, as well as a connection for the pump. This is soldered into place in the center of one cap. In the other, a gas cock is soldered for opening up pressure when ready

to fly. The engine cylinders are made up from fishing rod fer-rules or brass tuhing 1/32 wall, the pistons are of fibre, turned to fit the cylinders and tight enough to hold pressure and still move freely up and down. A rotating valve its made from a taper pin, and is so notched that it distributes the air as the crankshaft is revolved. In fact the crankshaft is nothing but a rotating valve, and by this arrangement much

weight is saved.

weight is ascen, writer designed this style of open crank, havings crankbalf acting as an open air distributor, compressed air motors weighted as much as three ounces—the one mentioned above weighed 1/5 ounce. The tank weighted but 7½ ounces, the tank weighted but 7½ ounces, the tank weighted but 7½ ounces, the complete model 15 ounces, and it had a wing spread of 5/2 inches. The surface was large for such a small

machine, but it was necessarily so to insure success.

Complete data have appeared in previous issues of Aerial Compete data have appeared in previous issues of Aera, Age regarding compressed air motors, and for those who wish to get specifications of these particular motors should write to our Subscription Department for back issues of Aerial Age, and get your order in for the next issues which will contain valuable information to the model builders.

BOYS-ATTENTION

In order to keep up-to-date with the news of the "Model" world, you will want to receive a copy of AERIAL AGE every week, and because we realize that \$4.00 seems a lot of money for some boys to spend at once, we have a very attractive offer to make. Write to us, addressing the Circulation Department, and we will tell you all about it.

Four members of the vic-torious illinois Model Acro-plane Club team thol won the Villard Cup and Aerial Age prizes. The names reading from left to right are: Lucas, Schweltzer, Jaros and Pease





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Taking Them Over

"Yes," said the little man in the train, "I'm glad the war's

yes, said the intue man in the train, "Im glad the wars over; I could do with a rest."

"Ah! done your bit, you "ave," said an old lady in the corner. "You're in the Air Force. Been at the Front?"

"Yes, mum, and I took over a thousand aeroplanes over

the lines. lines."

Some aviator," interrupted one of the passengers.

No air" rentied the talkative one, "I'm some photog-

"No, sir," replied the talkative one, rapher."—From Aircraft.

Precocious

Willie crashed his father's 'plane Right through the front room window pane, His father said, like one perplex'd, "That youngster will be smoking next."

-From Aircraft.

Piker

"Macdongal is a bit close, isn't he?"
"Close isn't the word! He'd rather stay up an extra hour than come down and wear out the tires on his undercarriage!" -From Aircraft.

Aboard the Trans-Atlantic Dirigible

A woman and he daughter were flying across the Atlantic during a terrific storm. After a silence of some time the mother asked:



The arrival of the 6:15 e, by Ding in the

"Are you seasick, dear?" "No. I think not, mother," replied the girl, "but I'd hate to yawn."—Awgwan.

A Bad Landing

Winsted, Conn. (from a press dispatch)—Hugh Rockwell, an aviator, of Plainville, is all "done up" as the result of his monoplane's landing in a colony of bees on August 4.

Before the aviator extricated himself from his wrecked machine he was attacked by hundreds of bees and stung in the face, neck, ears and parts of the body.

The engine, a light two-cylinder one, behaved splendidly until the last moment, but while nosing to the field the connecting rod in the cylinder broke and the plane came down, knocking over a swarming beehive.

Oh, death, where is thy sting!

Her Aeroplane Sermon

Grandmother there hears the engines of air-Sees the aeroplanes sailing by; ailing by and out of sight, Under and over the rainbows bright, Higher than home birds fly! Sailing on, through the dark and dawn, And then like the light o' the rainbow-gone!

> 'It's the miracle time, That I've lived to see Man, like the wild birds, Flying free-God's good to you and me!"

Over the city the birdman's wings Hover and dart and seem Like shadows-they say-Now of gold, then of gray, Shadows you'd see in a dream.

And they fly to the east, and they speed to the west,

And the storm drives them home, like birds to the nest!

> "It's the miraele time, Where the great wonders be, But God's love is greatest, And that's all we see-God's good to you and me!" -Frank L. Stanton in The Atlanta Constitution.

In a Military Manner

A reporter, in a camp where a number of negro troops were being discharged, asked one of them what he was planning to do when he got his release.

"Boys," said the negro, "the fust thing after Ah gets mah discharge. Ah goes and husts mah second lieutenant on the

"Oh, no you ain't, nigger," spoke up another, "you is gwine to git in line and take yo' turn."—American Legion Weekly.

Can't Get Along Without Them

"Why is an airship unlike the Bolsheviks?"

Because it can get along successfully in spite of its pro-peller's "revolutions."—Aircraft.

(Continued from page 1094)

mately they should be sold to private enterprises on such terms as would permit of successful operation, as it is not believed that commercial aviation will ever be successfully developed under Government control.

J. The remaining aircraft production industry should be conserved and kept in a healthy condition by a well defined and continuing program of production for military purposes, over a period of years. This policy should be continued until the commercial demand is adequate to support an industry of sufficient proportions to form an effective nucleus upon which can be built a war time production in case of need.

Technical Development

With reference to technical development, your Mission in submitting its recommendations bases the following conclu-sions on a knowledge of conditions existing in the United States and upon extensive investigations conducted abroad:

1. (a) The Mission visited plants making or experimenting

in materials as follows:

in materials as follows:

France—Bergeut, Bleriot, Renault, Farman, Hispano-Suiza,
Nieuport, S. P. A. D., Morans-Sanliner,

Alapy—Nanalok, Macchi, Caproni, Fomilio, Isotto (plant

Lapy—Manalok, Macchi, Caproni, Fomilio, Isotto (plant

England—Handley-Page, B. A. T., Rolls Royce, Phoenix

Dynamo, Bristo, Vickers-Vinny, Cosmos, Sopwith, GrahameWhite, A. B. C., Armstrong-Whitworth,

(b) The Mission has visited laboratory and experimental

shops as follows:

Institute Sperimentale Aeroniutico, Rome,

Historia Commentate Actionation, come. Eiffel Laboratories, Paris. R. A. F. Factory, Farisborough, England. Isle of Grain Naval Experimental Station, England. Pulham Dirigible Station, England.

Aeroplane Station, Contocelli, Italy.
Dirigible Station, Craspiano, Italy.
(c) The Mission has interviewed the following Governmental official and industrial officers upon the subject of the proper organization, scope and equipment of the Technical Division:

England:

General E. L. Ellington, Head of Department of Design, London, Royal Air Force. Sir Percy Herouard, Managing Director, Armstrong-Whitworth Company, 8 George Street, Westminster London

Ceneral Graves, R. A. F. Representative, with British Peace Commission, Paris. General Brooke-Popham, Director of Research, London. Mr. Hott Thomas, London.

Mr. Donglass Vickers, Vickers Ltd., London. Mr. Grahame-White, Grahame-White Aircraft Company,

Sir Samuel Waring, London.

France:

Major d'Aiguillon, Interministeriello de l'Aviation Civile,

Mr. Louis Breguet, Mannfacturer, Breguet et Cie, Cic des Messageries Aeriennes, Paris.
Mr. Caequot, Former Chief Technical Section, Dept., Mili-

tary Aeronauties, Paris.
Colonel Dorand, Department Military Aeronautics, Paris, eneral Duval, Director Military Aeronautics, Paris Mr. Jacques Louis Dumesnil, Deputy, Former Under-Sec-

retary French Aeronautics.
Captain del 'Estrade, Technical Service, French Military Aeronauties

Mr. Pierre Etienne Flandin, Deputy, Former Chief Inter-Allied Organization of French Aeronautics, Paris.
Mr. Messaguer, Head of Hispano-Suiza Co., Paris.
Mr. Manrice de Saint Blanchard, Sec'y Aero Club de

Mr. Daniel Vincent, Deputy Director, Former Under-Secretary of Aviation, Paris.

Italy: Commander Caldara, Head of Aviation, Technical Sec-

Commander Caudas, Freau of Aviation, Fectimeal Section, Rome.

Signor Casati, Designer, Caproni Co., Milan.

Lt. Col. Ferduzio, Designer of S. V. A. Rome Aeronautics, Rome.

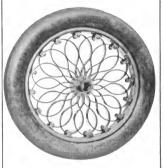
Colonel Croeco, Director of Institute Sperimentale, Colonel Guidoni, Italian Aeronautical Mission, Admiral Orsini, Ministry of Italian Aviation, Rome.

2. The form of technical organization and control recommended by your Mission differs materially from the controll-

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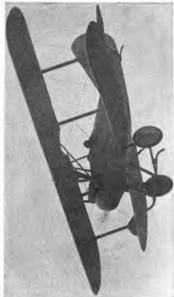


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ing organizations in Italy, France or England. Inasmuch as for some time at least military, naval and departmental flying seems likely to lead in the development of the art, your Maisson desires to lay emphasis upon the necessity of having the Technical Division so that they shall be materially helped and not hindered in their research, experiment and development. To the same end we are of the opinion that lighters of the war, the Technical Division is a present dominated by military personnel, but the opinion is unanimous that as time goes on civil personnel will supersede military in this division. General Ellington, England, expressed this opinion division, General Ellington, England, expressed this opinion England, holds the same belief. In the Royal Aircraft Factory, at Farnborough, civilian requirements are already overtaking military and naval. It has therefore been deemed wise to take the ultimate step at the outset in America, and a England, is recommended for America.

England, is recommended for America.

3. In equipment and personnel England and France and Italy are maintaining their war strength in the Technical plant, employing about 3,000 men and women and carrying on actively nearly every line of research, experiment and development in motors, planes and accessories. More than a score of planes, rigged with apparatus for aerodynamic experiment, were in the hangars and in the field. Physical and periment, were in the hangars and in the field. Physical and chemical laboratories seemed buy and fully manned. Esti-mating the lighter-than-air and the naval experimental and personnel engaged in the division in England is nearly, if not quite, equal to the entire trade in America at the present time. Obviously this branch of aeronauties lies at the very to bring it up to the standard of the world cannot help but mean dependence and mediocrity or worse in aeronauties in

America.

4. The inclusion of such topics as armament (Ordnance), photography. 4. The inclusion of such topics as armament (Ordnance), wireless (Signal Corps), instruments (Admiralty), photography (Signal Corps), design and bombs (Ordnance), etc, has been found necessary in all countries. In reality the design and supply of such appurtenances is left to the departments or bureaus specializing in them, but research and experiment and development in methods of installation and use is essentially a function of the Air Service [Centical Division]. and must be carried on by this division, both in the labora-tory, on the factory floor and especially in the air, in the tank and on the field.

and on the field.

So In all the field in th

must obtain access to Government facilities, through the officers of the division, so that new inventions, etc., shall pass the scratiny and criticism of the division heads before going into actual experimentation. In England an attempt has been made to furnish facilities at cost, but to save overhead, a schedule of flat prices is being worked out. whether or not to design complete motors and machiners no longer exists. France was forced to design aeroplanes in 1916, due to the failure of her private firms to meet the crisis created by the Fokker; but the immediate result appears to have been a quick return to the safer measures for encouraging the private designers to design and build, under the direction and assistance of the State. In England the complete design of aeroplanes ceased officers offered annie testimony that the making of complete officers offered ample testimony that the making of complete observed ample testimony that the making of complete designs was a mistake and would not be repeated, due to its effect upon the private design departments. Without exception the manufacturers appear to take the view that it would be idle to compete by private efforts it one division of the led life to compete by private efforts if one division of the Government was designing and another division buying, as the Government would inevitably favor its own designers, even though not quite so good. The result of such a policy, therefore, would be to limit the number of sources from which and of personnel in the design departments of private firms. 7. In 1918 Sir Arthur Duckham, then Director of Aircraft Supply for England, said:

"As we all know changes in design, unless they are actually formed types, my be absolutely against production; most formed the supplemental of the control of the c

too great perfection at too early a time."

Having this in mind and having in mind also the disastrous effects upon production of similar causes in the United States. your Mission asked explicit questions concerning the plan

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used by the Technical Division in England to minimize the result of such changes. The method is outlined as follows:
"All changes made necessary by the fact that a machine or motor is dangerous to the flier or to the public are classed as Number 1. These are imperative and are ordered by the Director of Design, without delay. No machine is allowed to be accepted or flown without such changes having been

"Important changes involving improvement in performance, etc., are classed as Number II. Such changes are made by order of the Modification Board described below, and became effective only at such time as not to interfere unduly with pro-

"Improvements and additions, not vital but often valuable, are classed as Number III. They are made when convenient, both to Government and to Contractor, and are not allowed

both to Coveriment and to Contractor, and are not anowed to interfere with production or greatly increase price."

A Modification Board shall pass on changes and classify them. This hoard consists of few members, one from the Technical Division, one from Production, one from Operations, one from Finance and one from Supply. In the case of Number I changes the Director merely reports that such and such changes have been ordered. All other changes are ordered by the Modification Board at regular meetings.
Your Mission is of the opinion that the establishment of

some such uniform practice, covering not only such changes but also the method of paying for them is essential to pro-duction and should be a responsibility of the Technical Divi-

Recommendations

(a) That all technical functions of the Government in re-(a) I nat all tectional functions of the Government in respect to aeronautics be centralized in a single I-chinical Division which shall perform the work for the Army, Navy and Cytl aviation; and which shall be headed by preferably a civilian of wild executive experience. Such a division should include as Assistants to the Director experienced representatives of Army, Navy and other Government departments interested in availation who shall be nominated by the departments. ments and shall act as advisers upon the special needs of the

service they represent.

(b) That steps be taken forthwith to secure for the United States the most advanced equipment for research, experimental and development work and for the testing of motors, planes, balloons, etc., for the testing of materials; for the examination and testing of aeronautical appliances, including

examination and testing or aeronautical apphances, incuding armanient and instruments; and that such an organization shall be established as shall assure at all times that the re-search, experimental and development activities of the Gov-ernment shall be second to none.

(c) That the research, experimental and development facilities and equipment now used in aviation by the Army, Nayy and other Government departments be inventoried inmediately and put, as far as practicable, under the control of the Technical Division, retaining such of same as may seem of the Technical Division, retaining such of saine as may seem suitable and bringing them under a central control to make them as unnecessarily duplicate others or are out of date. In making this change great care should be exercised to guard against measures which might tend to interfere with sug-gestions for improvements and advances in aviation, material and methods, coming from the operating aviation branches of the Army, Navy and Postal Departments. Experience has proved that the initiative in the advance of motors, planes proved that the initiative in the advance of motors, planes and accessories often comes from practical experience in the flying field, rather than from the scientific department of acronauties. The Technical Division will, in cooperation with the operating forces, study, work out and apply all such suggestions. Care should be taken also to avoid duplicating facilities already in existence, such as water tanks, arma-ment testing grounds and many other items operated by existing departments. Arrangements should be made whereby the existing plants of this sort can be used on a proper payment basis by the Technical Division.

(d) That extreme care be taken in such a process of ad-

(d) That extreme care he taken in such a process of adjustment to provide anythe means whereby the special techniques are provided anythe means whereby the special techniques are provided whereby military and mayal experiments of a secret nature can be carried forward. The rechnical Division cover by means of adequate personnel and equipment all branches of aeronautical research, experiment and development, including the application and aerial use of instruments, armaching the provided of the provided ments and munitions, wireless telephone and telegraph, bombs and fittings, sights, fire fighting apparatus, parachutes, air bags and other safety devices, motor appliances for air ser-vice, propellers and photography.

(f) That all the technical facilities of the Technical Divi-

sion for aviation, whether now existent or to be created, shall

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and reasonable terms.

(g) That in view of the experience of England and France it is dangerous to allow the Technical Division to operate under normal or war conditions a department of complete design in heavier-than-air machines or in motors, as such ments of design. The Technical Division, therefore, should be a critic of and supplementary to private design rather than aim at design on its own account. The policy of the Technical Division should be to maintain and encourage a considerable number of well-manned and well-entipled private taking, that neet with the approval of the Technical Division, and to place orders with these plants at fair prices for design and to place orders with these plants at fair prices for design and to place orders with these plants at fair prices for design and for experimental construction of motors, planes and ap-pliances. Competition of the Government with the industry should be avoided; the only allowable exception being cases where, either on account of expense or for other cause, the Technical Division cannot obtain needed material or design from existing sources.

from existing sources.

(h) That careful thought shall be given to the establishment of competition in motor, plane, balloons and accessory design, and encouragement be offered in every reasonable way to the promotion of competitive events and the establishment of standard records.

(i) That the Technical Division shall publish regularly and under competent management all the technical facts and data developed by the division that may be helpful to the indus-try, reserving at the same time to itself the right to preserve secrecy in all matters that are deemed to be in the nature of

Naval or Military secrets. (j) That such a Technical Division shall maintain at all times as close touch as possible with the development abroad and shall maintain representatives in Europe_charged with the duty of liaison between the American and European tech-

the duty of maison between the American and European teen-rical organization the method of payment for independent design, experimental production, changes in design, altera-tions and adjustments be worked out by the Government as quickly as possible to the end that the design and improve-ment of motors, planes, balloons and appliances may be stimu-lated and not stilled.

(1) That the Technical Division shall include an Inspection

and Testing Department, which shall carry on all inspections and tests of experimental construction and revision, and which shall issue certificates of air worthiness for all machines for shall issue certificates of air wortuness for a lin machines for private and commercial use, and shall, from time to time, in-spect all machines and appliances, including landing fields, sig-nals, etc., used by the public. In cooperation with the Civilian Division, this department shall have power to limit and con-trol all types of air machines used in commerce, and to test such machines before they become production models. This department should have power to examine the inspection methods of all private concerns building aircraft, and to pass upon the quality of such methods from time to time.

(m) That close cooperation be maintained at all times with the purely technical aeronautical bodies, and also with the industrial bodies engaged in aeronautics so that standardization of materials and practices may be carried forward as rapidly as can be done without hindering the development of the art or entailing undue losses upon the trade.

Respectfully submitted,

BENEDICT CROWELL, the Assistant Secretary of War. HOWARD C. COFFIN, Member of Council of Na-

HOWARD C. COFFIN, Member of Council of National Defense,
HENRY C. MUSTIN, Captain, U. S. Navy,
HAISEY DUNWOODY, Colonel, Air Service, U.
S. A., Assistant Chief, Air Service, A.E.F.
JAMES A. BLAIR, Jr., Lieut. Col., General Staff,
U. S. A.

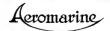
GEORGE H. HOUSTON, Pres. Wright-Martin Aeroplane Corporation. C. M. KEYS, Pres. Curtiss Aeroplane & Motor Corporation.

S. S. Bradley, Manager, Manufacturers' Aircraft Association. *Note: Subject to memoranda I and 2, July 19, 1919. R. M. S. "Aquitania," July 19, 1919.

Memorandum No. 1. Report of the Organization Committee, American Subject: Repor Aviation Mission.

1. I concur with the report of the Organization Committee of the American Aviation Mission, to which I have affixed my signature, with the following reservations

(a) Provided that the personnel employed in Naval Aviation operations shall be composed exclusively of officers and



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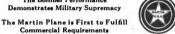
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enlisted men of the Navy, Marine Corps, Naval Aviation Reserve and where required for shore establishments of civilians under the employ of the Navy. (b) Provided that all advanced training of Naval Aviation

personnel excepting advanced aviation engineering courses shall be under the direct control and supervision of the Navy. (c) Provided that when officers and enlisted men of the Navy, Marine Corps or Naval Aviation Reserve are detailed for duty with the proposed Air Department they shall retain their Naval or Marine Corps ranks and ratings.

(d) Provided that administration and operation of all Naval

Aviation forces shall be under the direct control of the Navy. (e) It is recommended that the question of including in e proposed Air Department an offensive Air Force independent of the Army and Navy be left open, pending further investigation of this subject; and that the subject be investigated without delay by the Mission in conference with Army and Navy representatives who have made a special study of military and naval strategy. HENRY C. MUSTIN, Captain, U. S. N. (Signed)

R. M. S. "Aquitania," July 19, 1919.

Subject: Report of the Development Committee, American Aviation Mission.

I concur with the report of the Development Committee, to which I have affixed my signature, with the following reservation

(f) Provided that nothing in the organization of the pro-posed Air Department shall restrict the Navy in the following activities (a) Maintenance of an organization adequate for the prepa-

ration of general specifications, general plans and characteristics of the aviation mechanisms, accessories and equipment required for Naval purposes.

(b) Maintenance of an organization and facilities adequate

for carrying on experimental aviation work of a class that is exclusively of a Naval character, and that does not involve duplication of efforts and facilities in the proposed Air De-partment that are common to other aviation branches. (c) Maintenance of an organization and facilities for con-

ducting the acceptance and tactical tests of complete aviation mechanisms and accessories. (Signed) HENRY C. MUSTIN, Captain, U. S. N.

The Liberty Caproni Biplane (Continued from page 1091)

altitude adjustage are controlled by means of extra-flexible Bowden cables. The radiators (Rex Manufacturing Co.) are two for each engine and work in parallel.

Each engine has its own oil tank with oil radiator (of corrugated copper sheet) and by-pass, so that in cold weather corrugated copper sneet) and by-pass, so that in cold weather the radiator can be excluded from the circuit.

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One alone of the two gasoline pumps is sufficient to feed the entire system.

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The lighting and heating system is fed by a wind-driven generator of ((X) watts, combined with a storage battery.



Vol. 9, No. 245

SEPTEMBER 1, 1919



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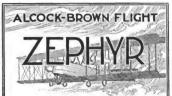
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VOL. IX

NEW YORK, SEPTEMBER 1, 1919

NO. 25

"DO YOU KNOW ANYBODY WHO IS BUYING A PIANO?"-GLENN H. CURTISS

NE of these chronic pessimists who have been standing in the way of aeronautic progress was arguing with Mr. Glenn H. Curtiss that he could not see much of a future for civilian aviation.

"I don't know anybody who is buying a 'plane," he said, with a tone of finality, and apparently fully convinced that his argument was unanswerable.

"Do you know anybody who is buying a piano?" inquired Mr. Curtiss.

Of course he did not, nor do you, gentle reader. You do not ever know anybody who is buying a Ford or a hat of a pair of shoes. Yet the piano factories are as busy as ever—and the last report had it that Henry Ford had paid the best part of one hundred million dollars for the minority stock of the Ford company.

Nevertheless, over five hundred aeroplanes have been sold and delivered to individual owners since March, 1919, and the reason not over that number have been delivered is that the manufacturers were liquidating their government con-tracts and could not produce faster.

The demand is as great for \$7,500 pleasure 'planes as it is for \$2,500 'planes.

A great many buyers acquired Curtiss training 'planes be-cause they could not get the "Oriole" type of pleasure 'planeor any other type

The first "Oriole" was built for the Second Pan-American The first "Oriole" was built for the Second Pan-American Aeronautic Exposition, which was held at Atlantic City in May, 1919. It will be recalled Roland Rohlfs flew it to Atlantic City on May 181 in a storm, carrying the Hon. Victor Hugo Barrance, the proper secretariave of the President of Caba, as caused the Curias company to put it in production. It was decided to build ten, then twenty, then thirty-five, then one hundred and thirty-five. We will not give away a trade secret by stating the present number of "Orioles" and flying boats sold to-day, but we may state that over one hundred people to we may state that over one hundred.

soot to-day, out we may state that over one numbred people are waiting patiently—and some impatiently—for deliveries. Here is another case. A well-known veteran aviator secured the agency for second-hand military training aeroplanes and inserted five advertisements in AERIAL AGE. He got over and inserted nive advertisements in AERIAL AGE. He got over four hundred orders and inquiries—but has been unable to get 'planes fast enough to fill the orders. Another AERIAL AGE advertiser had only one 'plane to sell and wanted \$7,500 for it. He sold it—and had a score of prospective customers to spare.

AERIAL MAIL PLAN SAVES \$170,000 YEARLY

HE aerial mail service between New York and Washington and New York and Chicago has already saved the country \$170,000 a year over the railway mail, and when the multi-motored aeroplanes are in operation there will be an annual saving of \$1,500,000."

Assistant Postmaster General Otto Praeger made that state ment before the Cleveland Chamber of Commerce, which held an aviation week in celebration of the one hundred days' per-

an aviation week in celebration of the one hundred days' per-fect mail service between Cleveland and Chicago.
"During the one hundred days," said Mr. Praeger, "the Cleveland-Chicago division has been in operation the mail ships have flown a total of 65,000 miles and carried more than 3,000,000 letters. It has brought the East and Middle West closer together by sixteen hours, and the Atlantic and Pacific coasts by twenty-four hours.

"We have given you a demonstration of what the aerial mail can do, and it rests with the people now to tell Congress what to do.

Alva Bradley, chairman of the aviation committee of the Cleveland Chamber of Commerce and vice-president of that body, read the following resolutions adopted by the directors of the chamber:

"Whereas, For the past one hundred consecutive days the aerial mail service between Cleveland and Chicago has been operated successfully, thereby demonstrating the practicability of mail transportation by this means; and "Whereas, The aeroplane terminal facilities in both Cleve-

land and Chicago are inadequate to accommodate even the

land and Chicago are inadequate to accommodate even the present limited traffic; and "Whereas, Owing to the increase of aerial transportation, an urgent need for Federal regulation of aircraft traffic is apparent; now, therefore, be it apparent; now, therefore, be it apparent; now, therefore, be it opposed to the proposed traffic and the proposed traffic and that the Chamber of Commerce further petitions the Post Office Department, in cooperation wherever practicable with the military and nayal avaition services, to extend the aerial mail service as rapidly as possible throughout the United States, and especially to mail service is now in operation. Those cities where aschimate services is now in operation.

mail service is now in operation.

Mr. Praeger said he expected the aerial mail to be in operation to Minneapolis, Omaha and St. Louis by early spring, when multi-motored ships, carrying as much as 3,000 pounds of mail, would be available.

Colonel Dunwoody declared that the European nations, and Great Britain especially, were encouraging aviation, and warned that unless the aviation industry of this country were given the benefit of a fixed American policy it would rapidly die out, with the result that when America again wanted an

air service it would find it had none.

As a result of the joint activities of the Cleveland Aviation Club and the Cleveland (Chamber of Commerce twenty-two Ohio cities, including Cincinnati, have set about establishing landing fields within the week.

about noon.

THE NEW YORK-TORONTO-NEW YORK RACE

Thirry-SIX military and three civilian aviators participated in the New York-Toronto-New York race for which John McE. Bowman offered \$10,000 in cash prizes and the American Flying Club and the Canadian National Exposition offered a trouby.

The Prince of Wales did not start the race from Toronto, as had been announced. He was not present for the start. The start from Toronto was made at Leaside, a suburb of the city, though most of the judges were at the exhibition grounds.

Twenty-eight planes made the start from New York and eleven from Toronto.

The first plane to arrive from Toronto was the De Haviland 9A, piloted by Sergeant C. B. Coombs, who covered the stance in 6 hours and 21 minutes, reaching Roosevelt Field at 7:11 P.M. Roland Rohlfs arrived seven minutes later and he was followed by Major R. M. Schroeder, who landed four minutes after him.

The first plane left Roosevelt Field for Toronto at 1:57 P.M. The start had been delayed for five hours by rich Three planes from New York were wreeked on landing at the Allbany field, and many others had to abandon their journey at various points along the route owing to engine and other troubles.

Of the total thirty-nine machines, thirty-two reached Albany. Six of these had made the start in Canada and twenty-six in Mineola.

Three of the fliers who entered in the air race have completed the round trip as we go to press. All are Americans. Lieutenant M. B. Plumb, flying a De Haviland 4, alighted at Roosevelt Field, Mincola, at 5:50-30 o'clock in the afternoon. He had started in the morning from Syracuse, where darkness overtook him Monday evening, and had flown to Toronto, starting from the Canadian city on his return trip

Better time, apparently, was made by two fliers who finished at Toronto, whence they had started Mondag, Major Rudolph Schroeder, who flew a VE-7, arrived at Leaside Park, just outside the city, at 5:20 o'clock. His actual flying time, according to his log, for the 1,000-mile trip was 9 hours and 25 minutes.

Colonel Gerald Brandt, another American, who also had started from the Canadian point of departure, arrived a few minutes after Major Schroeder.

Eight new entants started from Mineola Tuesday morning. Major Schroder, Sergeant A. B. Coombs and Roland Rolhis, who arrived at Roosevelt Field Monday evening, started northward early in the day, and five others who had started from the Canadian end of the race, arrived at Mineola and departed on the return trip before the close of the afternoon.

Several accidents occurred. Lieutenant Austin Crebore, of New York, one of the new contestants, was activusly injured in making a landing at Albany while on his northward trip. His arm was broken and he received possible internal injuries. Others put out of the race by mishaps included Captain Steinle, whose S1-5 was smashed while making a landing at the control station at Buffalo, and Major Elliot Spring, whose plane developed engine trouble and forced him to devecud near Batavia, N. P. Following E-7 list of the contestants and the types of ma-

Following is a list of the contestants and the types of mi

Liett, P. H. Logan (Le Pere), Capt. J. C. Foote (L. W. F.), Major Elliot Springs (L. W. P.), Capt. O. E. Simonian (De Haviland 4), Lieut. Chas, Colt (SE-5), Capt. J. O. Donaldson (SE-5), Leatt. Wm. C. F. Brewn (De Haviland 4), Major Lewis Hasslitt (De Haviland 4), Lieut. R. F. Midsliff (De Haviland 4), Major J. W. Simons (De Haviland 4), Capt. Steinte (SE-5), Capt. R. S. Brown (SE-5), Lieut. Bu. I. Cle Haviland 4), Capt. F. E. Kimfler (Se-5), Lieut. Bu. I. Plumb (De Haviland 4), Major Gilkimson (Curtiss), Capt. H. B. Chandler (JN-H P), Lieut. N. R. Taylor (De Haviland 4), Lieut. L. W. Bertand (Curtiss training), Capt. Richard Depew (JN-4 D), Liabor J. L. Lyons (JN-4 D), Lieut. B. N. May-curtis (JN-4 D), Liabor J. L. Lyons (JN-4 D), Lieut. B. N. May-curtis (JN-4 D), Lieut. B. N. May-curtis (JN-4 D), Lieut. B. N. May-curtis (JN-4 D), Lieut. B. May-curtis (Jn-4 D), Lieut. B. Lieut. William Coates (De Haviland 4), Lieut. William Coates (De Haviland 4), Lieut. William Coates (De Haviland 4), Lieut. Ross Kirkpatrick (De Haviland 4), Lieut. Ross (Curtiss), Sergeant A. B. Coombs (De Haviland 4), Lieut. Ross (Curtiss), Sergeant A. B. Coombs (De Haviland 4), Lieut. Co. Schiller (JN-4), Capt. H. W. Cook (Fokker), Capt. S. S. Moore (JN-4), Capt. H. W. Cook (Fokker), Capt. S. S. Moore (JN-4), O. S. Palmer (Curtiss), Bert. Acosta (Curtiss), Colonel William B. Barker (Fokker).

On Tuesday evening the leaders in the race on Monday were well lehind. Sergeant Coombs left Alliany before noun, and though reports had not been received from him it is estimated that he must have got to Syracuse. Rohlifs, Backer, Schiller and Acosta were an hour or more behind him, with not definite reports after they had left Alliani.

Those who should finish at Mineola during Wednesday are Col. Hartney, Lieut. Colt, Capt. Simonin, Lieut. W. C. Brown. Major Simons and Lieut. Midkiff, the last two squadron mates of Plumb.

So far the only civilian flier to make a showing is Roland Rohlfs.

Plumb was enthusiastically greeted at Roosevelt Field. Officers and eulisted men had been straining their eyes for an hour, knowing that he was on the way from Alhany. As soon as his plane was heard a hundred strong glasses were turred upon it. The moment the number was read a cheer wort up that could have been heard in Hoboken. Men from all parts of the camp rushed to the field to welcome him.

And when he had climbed out, shaken hands with Col. Archie Miller and other officers, he climbed back in again, posed a moment for the photographers and movie men, and rose in the air. Once up he put his plane through some of the most thrilling stunts that even Roosevelt Field has ever seen, as if to show that even a thousand-mille race couldn't bother her. Then he hopped over to his home station at Hazelhurst Field and went to bed.

Plumb's flight yesterday was nerty from end to end. Between Buffalo and Syracuse he was compelled to land to replenish the water in a leaky radiator. He made the landing in a confield, horror of all aviators, made it successfully, filled his tank, tied up the leaky place with a bit of towel and got away again in perfect form.

Fire was his other peril. Shortly after leaving Buffalo a piece broke out of his exhaust pipe and flames swept up into his face in the cockpit. He was obliged to drive the rest of the way with reduced gas pressure in order to save his face from the flames.

He attributed his good luck to two mascots—a five-dollar gold piece tied up in a greasy handkerchief and a bit of goldenrod. He refused with a grin to describe the origin of either. "They worked, didn't they?" was his only comment.

So far a setting first home is concerned the race has been all to the De Havaland homining planes at the Army Air Service, equipped with 400 horsepower Liherty motors. This by no means establishes superneasy under the peculiar conditions laid down for the present contest. For the first time the American Flying Club has worked out a handicap formula for aeroplanes. Under it victory depends upon the degree with which each machine exceeds or falls below the speed which the

Flying Inck, of course, enters into these calculations and the mediuse that meet the greatest amount of head winds will suffer for it. Likewise those that ride favoring gales will gain. But, as any entrant could choose his starting point, it all goes to prove the airmanship which will gain the \$10,000 or prizes hung up by the Hotel Commodore for the civilians and the commendations for the soldiers who are barred from the money. Dryce

its horsepower and carrying power should give it.

Dalling by Google



THE NEWS OF THE WEEK



Glidden Plans Two Year Aerial Tour of the World

Atlantic City, N. J.—Captain Charles J. Glidden, donor of the Glidden trophies for automobile and aerial touring, is contemplating a two-year aerial trip around the world. Captain Glidden stated that he intended to cover in one or two years all the points reached in his automobile tour of the world, which required eight tour of the world, which required eight years. On the automobile tour the ex-treme points were the Arctic Circle in Sweden and the most southerly road in the world in New Zealand.

Captain Glidden has driven motor cars in thirty-nine countries, twice around the world, covering a distance of 100,000

Army Plane Fires on Bandits

Fort Sam Houston, Tex.—An army ob-servation 'plane fired on a group of Mexi-can bandits on August 19, believed to be the band which captured Lieutenant Peterson and Lieutenant Davis. The following is the official report from Colonel

"Observation 'plane returning here to-day (August 19) reported having seen three bandits about ten miles west of Candelaria. Bandits fired on plane. Fire returned, and aviators believe one horse and one bandit killed, and another bandit took to a nearby canyon, his riderless horse escaping. Both wings of 'plane show bullet holes. Langhorn."

Three New Landing Fields in Pennsylvania

Harrisburg, Reading and Scranton have each laid plans for the establishment of aerial landing fields. At Harrisburg a committee of business men have been a committee of business men have been working with the City Council to establish their landing place at the western end of the city. A committee of the Reading Chamber of Commerce, which is consulting with city and county officials, is working out plans for the construction

is working our pains for the construction of an aerodrome at a site near the local almshouse. The field is large enough to accommodate one hundred 'planes. The landing field at Seranton has been officially dedicated by Mayor Alexander Connell. It is pronounced one of the best municipal fields in the locality.



. Cloud Johnson, the Managing Director of ils-Royce Ltd. who is now in the United States in the interests of his company

Aerial Explorers Over Labrador

Curling, N. F .- Captain Daniel Owen, R. A. F., with a party of aviators who have been making exploration flights over Labrador, returned here on August 22 after a month near Battle Harbor. The expedition was successful in locating timber lands from which millions of cords of pulp wood can be cut and rolled to streams for direct shipment.

The expedition, which included in its equipment three aeroplanes and comprised a personnel of twenty persons, among them five aviators, operated seventy miles north of Battle Harbor. Two million acres of timber land was explored by air and by the ordinary methods of timber cruising. Pictures taken from the air, numbering 13,000, were said to show dense growths of pulp material. This use of a new field for commercial aviation.

The planes cruised inland for more than 100 miles, flying at heights of 2,000 to 9,000 feet

Salesman Gets Large Orders on Speedy Flying Boat Trip New York, N. Y.—Roland Bassett, chief salesman for Sweet, Orr & Co, overall manufacturers, is the first salesman to employ a flying boat on a selling trip. He flew on August 20 from New York to Poughkeepsie and return, making numerous stops en route. Starting at 1:35 P.M. from West Eighty-third Street, he first stop was made at Yonkers, arriving there at 120 P.M., and being tendered a reception by the leading merchants of the town, "Mayor Johnson and about 1,000 spectators. The honor of handing the first order to an aerial salesman there fell to George W. Horton, a Yonkers clothing dealer, who handed Bassett a \$400 order and suitable congratulasett a 2000 order and suitable congrafula-tions. Leaving there at 2:10 P.M., the next stop, Peekskill, was made in 25 min-ntes. The first Peekekill order was given by Decatur, Posey & Yellott, dry goods dealers. Newburgh was reached at 3:15 P.M., five minutes ahead of the scheduled r.m., and there also an informal reception was staged for Bassett. The first order was given by Sig and Max Samuels. Poughkeepsie was reached at 3:56 P.M., Poughkeepsie was reached at 3:50 P.M., by which time the flying boat was ten minutes ahead of the schedule. At this point Bassett and Pilot Zimmermann point Bassett and Pilot Zimmermann orders they purchased newspapers, taking off for New York City at 4:30 P.M. Immediately following their arrival off 33rd Street at 5:35 P.M., the successful air salesman and his pilot were tendered. a complimentary dinner by the officers of Sweet, Orr & Company.

Mr. Bassett stated that the flying boat is the ideal means of travel and predicted

that it would soon come into general use for traveling men. Lack of suitable land-ing places was the chief difficulty encoun-

As a result of the success achieved by their pioneer aero salesman, Sweet, Orr & Co. announced that they will place orders for three similar type Aeromarine flying boats.

Aeroplane Hunts Moonshiners

Montgomery, Ala.—Use of aeroplanes in locating illicit distilleries in the Alaiii locating illiest distilleries in the Ala-bama monintains was inaugurated, Deputy Marshal J. A. Wall making a trip over the surrounding territory. He announced later he expected several arrests to follow.



first test of the Lawson 26 passenger carrier, powered by two Liberty motors took place recently at Lawson Field

Lands and Takes Off from Warehouse

Newark, N. J.—Edwin E. Ballough, of Newark, who was formerly in the Army Air Service, landed an aeroplane on top of a building on August 22 at the Guartermaster's Depot in Newark, and then is the first time in the history of aviation that such a feat has been accomplished, although a Ferenh aviator once succeeded in landing on a building in Faris. The Off' from the roof as Ballough di, lake

Ballough had as a passenger in his machine Chris M. Wagner, a Newark newspaper photographer, and after taking pictures of the depot and the shippards of the Sulmarine Boat Corporation, the terowd below. He came down to a very low level, and swooped in and out very low level, and swooped in and out on the condition of the many depotent of the second below the came to the many depotent on the road of one of the depot ware-houses came to him suddenly and he determined to try.

termined to try it.

If a picked we warehouse 987 feet the picked to wide, with a peaked root, inclining slightly downward on either side of the peak. The machine spiralled down to a low level and straightened out just a picked with the peaked with the p

Lieutenant Arthur Brown, Trans-Atlantic Flier, Arrives Here September 20th

New York, N. Y.—Information has been received here that Lieutenant Arthur Whitten Brown, the navigator of the Vickers-Vimy transatlantic aeroplane, will arrive in the United States on September 20. He will make an extensive lecture tour through the United States under the direction of the James B. Pond Lyceum Burean. First Lawson Air Liner Completed Milwaukee, Wis.—The Lawson Air

Milwaukee, Wis.—The Lawson Air Line Transportation Company of this city has completed the first of its type C-1 passcuger carrying aeroplanes, described in detail in the July 7 issue of Aerial Age Weekly.

It machine is of biplane type, powers of the machine is of biplane type, gowers are some of the wing dispersed is 95 feet, length of the body 50 feet, and speed of 90 to 100 miles an hour, to According to Alfred W. Lawson, the designer and constructor, one engine has sufficient power to continue flight for 200 similes in case the other engine bracks.

With a full load of passengers and a large cargo of mail or other material, this machine will climb 4,000 feet in ten minutes. It has a ceiling of 15,000 feet. The gliding angle of this plane is so great that it will glide from thirty to forty miles with the engines cut off at 15,000 feet, and the glide angle is so flat that it will not affect the confidence of the passengers, especially those who have

never been up before.

Seats are placed at the windows on each side of the cabin, which allows plenty of vision for the passengers, together with a feeling of great security.

It is operated by a captain and two lientenants, who act as pilots. An engineman and a mechanic are also carried along on the trip as crew in case of need.

Affred W. Lawson will act as captain of this first ship until one of the two licutenants has been instructed and is capable of handling the ship in accordance with the new commercial code of flying safely as expected by Mr. Lawson As soon as pilots prove their capability of ready for service, the pilots will be promoted to become captains, and will then be given command of slips.

It is the intention of the Lawson Company to build a number of this type of ship within the next few months, to be used in regular daily service between New York and San Francisco, stopping at the leading cities en route. The new Lawson air liner has already been taken to the Milwakee County avi-

been taken to the Milwaukce County aviation field and is being put thru its initial tests.

Within the next few days it will be started out on a pathfinding tour between Milwaukce, Chicago, New York and San Francisco, and those cities which offer the most suitable landing stations will be selected as the first stations upon the trink line between the Atlantic and Pacific Oceans.

Ohio Ready to Receive Aerial Tourists Cicceland, Ohio.—The Cleveland Aviation Club, in response to telegraphic requests to Ohio cities regarding landing facilities for aerial tourists received replies from many cities declaring themselves to be prepared for aerial tourists. These cities include Cincimati, Youngsfund of the Company of the Company of the Manufold, Findlay, Cambridge, Sandusky and Hamilton.

and Hamitton.
Although unfavorable weather conditions existed on the opening day of Cleveland Aviation Week, 12,000 people watched a squadron of seven Army planes go through evolutions and stunts over Cleveland Aviation Field. More aeroplanes and a number of balloons will join the squadron before the end of the celebration.

The Cleveland Aviation Club has a membership of which nearly two hundred are Air Service aviators and it is devoting its efforts to making Cleveland a great flying center. This city is on the New York-Chicago and the transcontinental air line.

Air Service Recruiting Discontinued

Washington, D. C.—According to an official statement issued by the War Department News Bureau on August 20, instructions are being issued discontinuing at once enlistments for the heavier-than-air and for the lighter-than-air branches of the air service.

Italian Dirigible to Be Demonstrated in Washington

Washington, D. C.—Lieutenant Signor Angelo Faroli Piazza, R. I. N., will demonstrate the Italian O-9 dirigible to naval officials in the near future. Lieutenant Piazza has received many decorations for his heroism in the war.

Joint Army and Navy Planning Board and Committee Formed

Mashington, D. C.—War Department General Order No. 94 provides for the formation and personnel of a Joint Army and Navy Board and a Joint Army and Navy Board and a Joint Army the following membership: (1) For the Army: The Chief of Staff; the Director, Operations Division, General Staff; the Director, War Plans Division, General Staff. (2) For the Navy: The Chief of Naval Operations; the Director of Plans Division, Naval Operations.

The function of the Board is to secure co-ordination of effort of the two services.

Wadsworth Urges Purchase of Army Air Fields

Washington, D. C.—The purchase of March, Mather, Ream and Ross fields in California; of Ellington, Kelly No. 2, and Brooks Field, Texas; Park Field, Tennessee: Selfridge Field, Michigan: Chanule Field, Illinois: Chapmin Field, Plorida, and the repair depot at Mongomery, Akbama, is proposed in a bill introduced by Chairman Wadsworth of the Military



A tew Curtiss Urioses being put through final tests at the Curtiss Field at Buffale



The AIRCRAFT TRADE REVIEW



Duesenherg in New Willys Corporation

New York, N. Y.—Officials of the Due-senberg Motors Corporation announced that it is a subsidiary of the recently formed Willys Corporation, organized to manage the holdings of John N. Willys. The Duesenberg Corporation was formerly a subsidiary of the American Can Company. The new six-cylinder Willys-Overland car is to be constructed at the Duesenberg plant.

Alaska Aircraft Corporation Plans Huge Freight Planes

Seattle, Wash.-The Alaska Aircraft Transportation Co. has been incorporated under the laws of the State of Washing-ton for the purpose of building and operating aeroplanes for carrying passengers and freight. The officers of the company have an intimate knowledge of topograph-ical and climatic conditions in Alaska, as well as of the aircraft and transportation industries.

Flying fields, hangars and shops will be located at Valdez. It is planned to establish landing fields in the interior to replace the present hazardous and uncertain transportation conditions. A machine to carry six tons of freight, having four motors and 3,360 square feet of support-

indiors and 3,500 square feet of supporting surface is to be used.

The officers of the company are: Tod
M. Date, president and general manager;
Milton Van Dyke, first vice-president;
H. E. Ellis, second vice-president; James
P. Holman, secretary and treasurer. Mr. Tod M. Date, the president of the company, has had twelve years of experience with transportation problems in the North, and was connected with the Standard Aircraft Corporation during the war and the Naval Aircraft Factory at Philadelphia, Associated with him are a group of experts who have been connected with various aircraft companies as designers and constructors.

California-Catalina Service on Six Tripe a Day Schedule

San Pedro, Cal.-Syd Chaplin, motion

picture star, who has taken up aviation, has inaugurated the first passenger air line in America, which is believed to be the first ever put into daily operation Operating between San Pedro, Califor-nia, and Santa Catalina Island, the Syd-

Chaplin Aircraft Corporation is now running a fleet of Curtiss Seagull flying boats ning a nect of Curtiss Seaguit nying boats on a six-times-a-day schedule, carrying passengers, mail and express. The dis-tance covered is about forty miles and the fare is \$27 for one way and for the round trip \$43.20. The schedule has been

in operation since the middle of July. The week-end schedule, Friday, Satur-day and Sunday, is as follows:

Leave San Pedro.	Leave Avalon.
5:30 A.M.	7:30 A.M.
9:30 A.M.	10:30 A.M.
11:30 A.M.	12:30 P.M.
1:30 P.M.	2:30 P.M.
3:30 P.M.	4:30 P.M.

6:00 P.M. 7:00 P.M. The midweek schedule, Monday, Tuesday, Wednesday and Thursday, is as fol-

lows: Leave San Pedro. Leave Avalon. 5:30 A.M. 10:30 A.M. 7:30 A.M. 2:30 P.M. 4:30 P.M. 3:30 P.M.

7:00 P.M.

Mr. Chaplain is the representative for the territory of Southern California and Arizona, and, in addition to passengercarrying service, he is opening up schools and distributing Curtiss machines, including flying boats and land machines.

6:00 P.M.

Curtiss Ships Planes to Rio and Buenos Ayres

New York, N. Y .- The first foreign shipment of aeroplanes since the war was support of aeropianes since the war was made recently, when six land machines of JN type and two Curtiss Seagulls were shipped to Rio de Janeiro. C. W. Web-ster, in charge of South American sales, sailed on August 23.

Passenger Boards Steamer from Seaplane Seattle, Wash,-Jasper C. Mayer, a Red Cross official, was forced to the steamer Kashimura Maru on July 12, hound for Siberia, on account of delay in obtaining his passports. The ship left in obtaining his passports. The ship left at 10:45. At 11:50 Mr. Mayer embarked aboard of Boeing seaplane piloted by Ed-die Hubbard. The seaplane taxied along-side the ship and Mayer signalled his associates aboard the steamer. Arrangements were then made to board the steamer by

means of the pilot launch.

Although the flight cost \$75, Mr. Mayer is well satisfied, having avoided more than two weeks' delay.

Houghton Now With White Company The George D. White Company, of Los Angeles, has secured the services of How-

ard D. Houghton, who will take entire charge of their propeller department, ac-Mr. Houghton has formerly been with

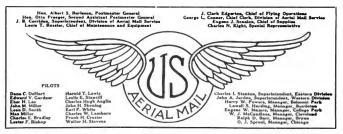
the Glenn L. Martin Company, the Wright-Martin Aircraft Corporation and other leading concerns as well as Government leading concerns as well as Government inspector before coming to the White Company. He lately has been with the Loughead Africraft Company where he designed and constructed the propellers used on the Liberty motored bombing scaplanes built by that firm for the United States Navy. Mr. Houghton's first duties with the White Company will be the construction of the propellers for the giant triple motored monoplane now being built for the trans-Pacific flight.

Wisconsin Aeroplane Firm Building Hangars

Eau Claire, Wisc .- The Eau Claire Aero Corporation has been incorporated with a capital stock of \$25,000 by local business men. A hangar is being con-structed on a new flying field established at the old fair ground south of Eau Claire. Ensign Virgil R. Grace, late of the United States Navy, is vice-president and general manager; Guy R. Wood is president, and A. J. Walsh secretary-treasurer.



A group of Curtiss pilots at the company's field at Buffalo. (From left to right): Victor Vernon, in charge of flying operations; Roland Roblits, helder of the world's elitiude record; Bert Accests, pilot; O. S. Parmer, pilot; in charge of seronsolical instruction of Junior Pilottsburg Camp; J. P. Deviss, assies manager, Curtiss Aeroplane and Motor Corporation; Walter E. Lees, pilot; D. Hill, pilot; G. A. Worsham, pilot



Postmaster Sinnott Makes Flight

rostmaster James F. Sinnott, of New-ark, N. J., made a flight in a Wittemann-Lewis Model C plane last week, piloted by Lieut. S. A. Morgan, former Army in-structor, flying from Newark to Asbury in 29 minutes. Postmaster James F. Sinnott, of New-

The trip was arranged by L. S. Plaut & Co., of Newark, who makes regular deliveries of their dry goods merchandise by aeroplane. Julius S. Meirick is di-rector of flying at the Plant plant.

Britain Investigates U. S. Aerial Mail Service

Cleveland.—That the American aerial mail service is attracting international at-tention is indicated by the receipt of a letter from Winston Spencer Churchill, letter from Winston Spencer Churchili, British air minister, to John A. Jordan, superintendent of the Cleveland-Chicago division, in which the minister seeks all possible data on the system. The letter has been forwarded to Washington. The letter includes data on British air

systems and points out that Great Britain is seeking every possible method to im-prove and develop aerial travel.

Mail Planes Test Alcohol Fuel

Washington, D. C.—One hundred and thirty gallons of alcohol were brought into Washington by an air mail plane of the Post Office Department recently. The plane flew 3,000 feet over the heads of

the excise officers and policemen on the lookout for bootleggers. The alcohol was not carried in the mail bags, which would be in violation of the law, but in the fuel tanks, nor was it peddled around in the haunts of the bootleggers after its arrival. The proper thirst for this character of alcohol has not yet been cultivated. It contains a fair percentage of benzol and enough ether to give it addi-

tional kick. The plane which brings in this alcohol every other day is known among the air mail pilots as the "Bootlegger," and is the forerunner of a revolutionary change in the motor operation of the Air Mail Service. This product is the new alcohol fuel which takes the place of the high-

grade aeroplane gasoline. After a num-ber of tests with this new fuel under adverse weather conditions, the Post Office Department is changing over its aeroplane engine attachment and will shortly be operating the entire New York-Washington route with the alcohol fuel.

Its great advantage lies in the cleanliness of the motor, reducing cost of up-keep, and in its burning cooler than gasoline, thereby overcoming objections to the high compression motor at low altithe high compression motor at low attractes. The planes which ordinarily use 25 to 26 gallons of gasoline operate on the new fuel on about 20 gallons, which gives greater flying radius to the planes. It reduces chances of forced landings by keeping the spark plugs and the engine

cylinders clean of carbon and oil accumu lations. With this fuel it will be possible to operate the mail in a De Haviland 4 regularly in a non-stop flight from New York to Cleveland, a distance of 430 miles, whenever fog or rain conditions in the mountains make it inadvisable to attempt to land at the intermediate field at Bellefonte, Pa.

Oriole Flies from Denver to Estes Park Denver, Col.-Seventy-nine years after the first white man, Kit Carson, entered Estes Park, Colorado, and sixteen years

after the first auto made its appearance at the same spot, a Curtiss Oriole three-passenger land machine recently made a passenger and machine recently made a successful flight from Denver to the fa-mous Colorado resort. Against a heavy wind blowing off the Continental Divide, the 'plane, carrying a special aeroplane equion of the Denver Post, made the trip in fitty-five minutes. In addition to several hundred copies of the paper, the machine carried I. B. Humphreys, president of the Curtiss-Humphreys Airplane Company, and Pilot A. M. Lendrum, and reached an altitude of 11,940 feet.

Personal Pars

Lieutenant Leon B. Wilcox, chief engineer officer at Chanute Field, has received his discharge and has been made chief motor instructor at the Academy of Applied Aeronautics, Chicago, Ill.

UNITED STATES POST OFFICE

AIR MAIL SERVICE—WESTERN DIVISION

JUNE, 1919

				1	19.0	1	i	-					11	SERVIC	E AN	D UNIT	COST	
Aeroplane No.	Gasoline	Greate and Oil	Office Force	Motorcycles. Trucks	Rent. Light. F. Power. Teleph and Water	Miscellamous	Pilote	Mechanics and Helper	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	Callons of Casoline	Total Time Run	Total Miles Run	Miles Run per Callen of Casoline	Cost per Hour	Cost per
61 62 63 64 65 66 67 70 72 73 74 75 76 3212 14872 39366	\$30 69 269 70 106 32 109 77 234 69 109 23 132 99 144 90 322 13 22 13 22 15 26 73 60 56	\$4 93 38 43 15 90 29 82 45 81 13 48 25 83 20 84 41 46 4 95 46 22 1 37 43 08 1 1 48 8 02	\$42 69 57 69 82 29 82 37 6.17 57 69 57 69	\$25 92 25 93 25 93 25 93 25 93 25 93	\$20 73 23,73 29,73 20,73 20,73 23,73 20,73 20,73 20,73 20,73 20,73 20,73 20,74 20,74 21,74 21,74 21,74	\$46 45 69 37 99 32 224 26 69 14 75 86 101 27 71 27 62 21 117 05 71 26 62 98 47 62 238 96 33 76 77 47 62	231 54 78 22 87 60 252 85 87 19 82 71 164 40 242 25 273 50 218 27 74 23	\$27 60 141 14 87 76 102 33 141 70 123 66 122 69 38 14 156 01 151 09 266 47 140 15 61 00 169 60 38 27 27 82	\$1 57 103 86 25 39 111 75 2 07 2 100 26 1 57 4 00 53 89 413 54 1 24 99 24 39 40	\$50,00 \$0,00	\$51.00 51.00 51.00 51.00 51.00 50.99 50.99 50.99 50.99 50.99 50.99 50.99 50.99 50.99	\$301 58 1,050 38 642 85 882 35 1,002 60 718 01 696 99 1,151 69 15 1,025 93 304 24 757 69 1,151 69 15 1,200 33 270 14 624 18 285 28	93 790 237 336 865 351 403 430 984 88 900 55 961 81	hr. min. 29 08 9 50 11 16 31 49 10 05 10 24 20 41 30 29 34 25 27 28	2925 500 1495 2925 693 1424 1950 3555 3250 2725	3.5 4.5 3.6 3.6	\$36 00 65 40 78 60 31 80 71 40 67 20 36 60 37 80 30 00 46 80 66 60	\$ 36 1 29 599 34 1 03 49 32 32 47 2 55
Total.	\$2,257.27	\$332.28	\$987.24	\$440 70	\$352.46	\$1,500.19	\$1.787.78	\$1,917.29	\$967.78	\$995 00	\$566 88	\$12,304 87	9768	224 55	21689	2 22	\$50.40	.57

"NEW PLANES FOR OLD"

THE WORK OF THE AVIATION REPAIR DEPOTS

By WILLIAM MENKEL

Former Captain in the U. S. Air Service and Commanding Officer of the Aviation Repair Depot at the Speedway, Indianapolis, Ind.

The Atiation Repair Depot at Indianpolit has been a horoughly co-ordinated and systematized that Arana. Ack has found it destroible to describe the entire system of the depot, and has been fortument in neuron the co-operation of Capit. Menkel in this work, under whose commund much of the good work of Indianmund much of the good work of Indianmund much of the good work of Indiantonian days of commercial aerial transportation, when every large efficient aircroft co-poration will require an efficient repair depot, the present article may well be taken as a substantial "standard pracles."

THAT the Air Service program apped out for war purposes was achaborate and expensive is well known and the public and an amount has been written in the public and an amount has been written in the public and are much as a public and an amount and an amount and are amount and dramatic object the defeat of the Boche by air. Yet few people realize the amount of a manifold amount and amount are manifold amount and amount are manifold amount and an amount are a manifold amount and support and supply deports, radio, photographic, gunnery and balloon schools, mobilization camps, testing field and acceptance park, and a multitude of

other institutions that sprang up almost like mushrooms in the night, botting the country from coast to coast and from North to South. A map of all the air service stations in this country alone, to service stations in this country alone, to make the country alone, to the country alone, the country alone alon

There was little opportunity for the public to know of many of these war plants of the air service, except for the popular to the air service, except for the popular to the front manually were principled to the property of the property, and over here the various flying popular to the property of the p

the air—these were matters that were seldom written about. Nevertheless, behind the heroic plane fighter over the lines was a series of im-

more than the construction to mention, not the least visual of which was the training field lands in the States or elsewhere, where the avisor did his first "solo," where the avisor did his first "solo," the solo of the so

Function of the Repair Depots

But there is where one of those numerous air service institutions, little known to the public at large, came to the rescue. For the hopeless-looking wreck was carefully gathered up, after proper official report of the accident, and the plane duly surveyed" by an officer—which is what happens to Government property when it becomes the control of the



AN ASSAL VIEW OF THE AVIATION REPAIR DEPOT AT INDIANAPOLIS in the center left hasd corner is the pattern in the hunding occupied by the Pamilie Bone, Aviation Experimental Works. In the super left hand corner is a portion of the Frest-O-List Factory. On the right send sides of the read running through the center of this group of debudlings are the Andministration Headquarters, the Quartermanter and Area Supply Buildings, and the shops, the two ingree hulldings in the background being the Engine Repair Building and the Area Averaght. On the Superimental Super

afterward as an apparently brand-new spick and span machine, ready again for the air. Of course, it may not have been entirely the same plane. It might well be entirely the same plane. It might well be nothing remained of the original machine that the number on the fuselage, which was always scrupulously retained even if everything else had to go by the board. But obviously the damage inflicted on so great. It varied from a slight injury to the engine, or a broken strut or wire (which was remedied right at the field), to the partial or total wreck that mude in machine a subject for the repair depot

And with the wreck written off the account of the flying field and duly shipped off, it was up to the repair depot to make good, to send out in its place a perfect plane, with shining doped wrings and not only saving Unice Sam millions of dollars by the salvaging of junk and the repair of broken machines, but also helping to maintain the supply of training the caser to master the air.

Important Improvements Devised in

But it was not merely in the routine repair work that these depots distinguished themselves. To them is due also the credit for making ingenious innovations in con-struction, resulting in greater safety for the pilot and increased efficiency of the the pilot and increased emiciely of the plane. For instance, it was noticed at the Indianapolis depot that many a machine that came in for repair had the curved edge of the cowl dented where the head of the pilot had struck as the machine crashed. It was thereupon decided to cut out a semi-circular section of this cowl out a semi-circular section of this cowl frame, thus making it more unlikely that the pilot's head should strike that section in a smash-up. The same thing was true of many of the instrument boards. They were so near the pilot that in a crash his head was likely to smash against it. One board, in fact, that came into the instrument room for repair showed the glass of the altimeter smashed and smeared with blood where the pilot's head had erashed into it. The instrument boards were thereafter accordingly set further away from the pilot's seat, giving him away from the pilots seat, giving nim more clearance, so that as long as the safety belt held him in, his head was less likely to knock against the instrument board in front. Another important im-provement showing the value of the close study given to the wrecks at this depot study given to the wreeks at this depot was the reinforcing of the longerons of the front cockpit. It was observed that in the majority of planes that had suf-fered head-on crashes the engine had telescoped into the cockpit. It is this kind of thing which accounts for the fact that the front-seat passenger in a head-on crash is usually the most injured, often fatally. The brace section of the lonhatally. The brace section of the iono-gerons was therefore strongly reinforced on each side of the front cockpit, this lessening the danger of the complete tele-scoping of the fore part of the fuselage, and greatly diminishing the chances of fatal injury to the occupant.

Locating the Depots

How the repair depets did all this work is one of the interesting phases of our was geronaute. The repair depots in this country were only three in number, but they were strategically located with relation to the flying fields, and they proved themselves fully adequate to rehabilitate the planes that the boys smashed



Turning out stick controls in the wood working department

up. Although our thirty-six figing felds in the United States were scattered all over the country, there were three main groups, geographically speaking. Texas had the greatest number, with its famous had the greatest number, with its famous Felds; and so one of the repair depots as conveniently located at Dallas. Eberts Field in Arkansas, Park Field in Emensese, Gernaner in Louistana and the Temessee, Gernaner in Louistana and the Justice of the Middle West were Selfridge and Lenders of the Middle West were Selfridge field at Mt. Chemens, Michigan; Scott at Rantoul, Illimoir; McCook and Wilbar Wright, Fields at Dayton, Ohio, and Payne Field at West Point, Kentucky. This group necessitated another repair depot for their requirements, and the Judiana of the Middle West were self-ridge for their requirements, and the Judiana of the Middle West Point, Kentucky. This group necessitated another repair depot for their requirements, and the Judianapolis. In addition to being cen-

trally located with reference to the flying fields to be served, the important elements in securing a good location for a sources of supplies and good shipping a facilities. The Indianapolis depot was especially fortunate in these regards, for the Hoosier capital is a converging point for many railroad lines, two of which have switches running right out to the ket in this vicinity for tools, machinery and other supplies is exceptionally good, and other supplies is exceptionally good.

The great centers of the automobile industry are only a few hours' ride distant. Raw materials like steel, lumber, and aluminum are readily obtained, and spare parts and miscellaneous supplies are within casy reach. Not only are machine manufacturers scattered all over machine manufacturers scattered all over States only a jump away, but right is the city of Indianapolis itself are many motor factories, machinery, tool and hardware



The wire department where broken wires are replaced and turnbuckles are adjusted. Roebling Co.'s wire is much in evidence here, as are also the turnbuckles of the Dayton Metal Productr

dealers. These concerns supplied much of the equipment of the Aviation Repair Depot located at the famous International Motor Speedway, and on innumerable oc-casions the proximity of these concerns rendered it possible to obtain immediately rendered it possible to obtain immediately tools and other supplies on emergency orders, saving days and weeks of time that would have elapsed in getting material from a distance. This meant that jobs were seldom held up for want of needed material.

needed material.

The plant is located about six miles out from Indianapolis, not far from the motor race track, the inside field of which is used by the Repair Depot as a flying field. Here planes that come for overhauling, and visiting aviators, land; and here also the repaired planes destined for fields in the immediately surrounding States are assembled, tested by civilian aviators employed for the purpose, and flown away. The Motor Speedway is used in this manner through the courtesy of Messrs. Carl G. Fisher and James A. Allison, of the Speedway Corporation, which also erected two haugars on the field and placed them at the disposal of the Government. The Repair Depot grounds occupy about twenty acres ad-



Major Patrick Frissell, J. M. A., Commanding Officer, Aviation Repair Depot, Indianapotis

joining the Prest-o-Lite factory and the plant of the Pomillio Bros. Avaition Experimental Works. Construction was begun in November, 1917. The score or more of buildings of the depot represent an outlay of \$650,000; the machinery and an outray of socious; the machinery and cquipment were installed at a cost of \$48,002.25. With 'leasehold rights and improvements, the total value of the plant approximates \$800,000, and, including the stock on hand, the value of the entire depot in buildings, property and equip-ment exceeds \$1,500,000.

Fire protection naturally had to be of the best, not merely on account of the value of the equipment in the shops, but because the destruction of the plant dur-ing the war would have meant a serious delay in time required to replace it. The overhead sprinkler system of the Inter-national Sprinkler Company of Philadelnational Sprinkler Company of Philadel-phia was therefore installed, while no-merous hand fire extinguishers were scat-tered plentifully throughout the shops, from the small Fyr-Fyter type to the larger Stempel Army Fire Extinguishers, and also the Badger Company's product. The mechanical equipment of the three aviation repair depots is practically the same, for the same kind of work, so that



INTERIOR OF THE DOPE HOUSE

ere thousands o gallons of Dupopi Dope and Sherwin Williams' Paints and Varnishes have been

An aeroplane wreck showing the condi-tion in which they metimes come the repair depot





THE WOOD WORKING DEPARTMENT

In this well-equipped along as the mounterfuler yeary most gart of an aeropiane except the br. J. Fay & Egan Company, Cincinnetty Hg. sav, wood lattle, shaper, plane surfacer, grint br. J. A. Fay & Egan Company, Cincinnetty Hg. sav, wood lattle, shaper, plane surfacer, grint store and saw, from the American Wood Warking Machine Company, Williamsport, Pr.; bad classes and saw, from the American Wood Warking Machine Company, Planover, Pr.; vises and fills for Hills and setting save, Machinery Company of America, Carona Rapido, Michagan; wood machinery and artiting save, Machinery Company of America, Carona Rapido, Michagan; wood machinery and setting save, Machinery Company, Indianapolit, and a Eaglerich of "moder, Vonangari Machinery Co. Indianapolit. Wellingboose motives are also used for fiviles the machinery and profit of the property of the Profits of the State Carona Cambridge, and as Eaglerich the machinery and profit of the profits of the state of the Profits the machinery contains the state of the Profits the machinery contains the profits of the profits of the state of the Profits the machinery contains the profits of the profits of the state of the Profits the machinery contains the profits of the profits of

the Indianapolis depot may be taken as typical in this regard. The nachines and tools were selected by Army aviation officers of exceptional engineering experience, and represent the result of their expert knowledge of the entire machinery field, and the requirements of aeroplane field, and the requirements of aeroplane soundability for the proper equipment of the shops and the efficient training of the personnel fell on the shoulders of the first commanding officer, Major (now Lieutenant-Colonel) Guy L. Gearhart,

and Captain Edward Laughlin, who was the chief engineer officer.

The Jahrt management system was organized on a basis of practical up-todate efficiency. The best shop methods in America were studied. Unnecessary routine and paper work were abolished, and red tape was not allowed to stand in the way of securing a needed bolt or servew or other supplies. No job was held up for lack of material. Supplies were obtained without delay from the

e shops and the efficient training of the stronnel fell on the shoulders of the stronnel fell on the shoulders of the st commanding officer, Major (now eutemant-Colonel) Guy L. Gearhart, encarest stockroom. The tool room was

IN THE PROPELLER ROOM

A propeller is seen on the balance stand (Rockland Tool Company, Rockland, Ill.), and ather
equipment includes a propeller viee 13. A Fay & Egan Company, Chicago, and abench
planer (J. D. Wallace Company, Chicago). The Star Plano Company, of Chicago, has been
furnishing propellers

placed in the center of each shop, making a trip to it of copul distance for all the workers, and the brass check system cadopted for checking out tools. The time cleck was applied both to the machine of the complete of th

Record of Production

The Indianapolis Depot was the first of the repair institutions to be equipped and get under way into actual production. The initial week arrived in April, gradual, due to the lack of the necessity blue prints, specifications, etc., and to the need for -instructing the raw, "ground aviators" in their new work. Wery soon, a day was reached, which was the estimated output on which the plant was built. Not long afterward, however, this depot adopted and lived up to the slogan onto the shipping platform three engines and three aeroplanes in each working day. Although at times the wrecks only trickled in one by one, there were other occasions stance, after the disastrous hurricane at Gerstere Field, Lake Charles, Louisiana, last year, when one hundred of the proken planes from that point were remonths later sixty Delfavilandar recovered from the sumken. American were sent here

for salvagging.

Up to the end of 1918 planes to the number of three hundred and thireten had been required at the 59-section of the 1918 planes to the number of three hundred and thireten plane motors with an approximate value of \$638,699, Also \$300,000 worth of wings, alterons, clevators, redders, stabulet of the salvaged of the s

The Montgomery, Alabama, Depot was not completed until July 1st, 1918. In its eight months of operation up to March 1,



MAKING SMALL PARTS

MAKING SMALL PARTS

MAKING SMALL PARTS

MAKING SMALL PARTS

The Small Parts and Weiding Department is equipped to fashion any of the great swirty of the sign in the same of the great swirty of the sign in the same of the s

1919, this Depot turned out 155 planes and 187 engines.

and 187 engines.
Most of the repair work has been on
the Curtiss types, the J. N. 4D and the
J. N. 4H, with Curtiss O. X. 5 and Hispano-Suiza motors; also Curtiss planes
with gun equipment, and Sumewith photographic equipment. A number of but
Haviland plane and the curtiss planes
when the company of the curtiss planes
when the curtiss of the curtiss of the curtiss planes. the shops. Various other types, such as Thomas-Morse, and some "hybrids" and obsolete machines of one kind or another

have at different times found their way into the depot. Earlier in the history of the plant Standards were also worked on, and one of the big Handley-Page machines is now awaiting repair at the hands of a competent force of aeroplane mechanics. The training of these me-chanics was in itself a notable achieve-ment. The Indianapolis personnel con-sisted of some thirty officers and four aviation repair squadrons, the 809th, 810th, 811th and 821st (150 men each),

A CORNER IN THE INSPECTION DEPARTMENT

This department makes use of many instruments for search and minots measuring and gauging, such as micrometers and calipers manufactured by the Brown-Sharpa Campany, Providence, R. I.; the Scheracope for testing the hardness of metals (Shore Instrument & Mig. Co., N. Y.), as well as ordinary small Buffale Scale Company's weighing scales. Some of the micrometers are also furnished by the L. S. Starrett Company, Athol, Mass.

with medical and quartermaster detachwith medical and quartermaster detachments in addition. Three of the squadrons came from the big air service mobilization camp at Kelly Fields, Texas, and the fourth was recruited from Induanapolis and the vicinity. About four hundred and fifty of the six hundred squadron men were gradually absorbed into the shops, and these, together with thirty-two civilian employes, made up the working force. The soldier workmen, although belonging to aviation repair squadrons, were by no means expert aeroplane mechanics when they arrived.

Making Aeroplane Mechanicians

How Uncle Sam secured a competent body of aviation shop workers is an in-teresting story in itself. In fact, one of the remarkable achievements of the American Air Service has been the en-American Air Service has been the en-listing and inducting of a large mass of miscellaneous civilian mechanics, the vast majority of whom had never had any-thing to do with aeroplanes before, and turning them in a few short months expert aeroplane workers. Outside of the plane mechanicians were practically non-existent. The trade had not assumed a standard and recognized place in our in-dustrial life. With the entrance of the United States into the war and the planning of the great air program the coun-try was combed for mechanics and tradesmen of all kinds whose experience rendered them valuable in the construction of various parts of an aeroplane.

These included automobile body builders, motor mechanics, blacksmiths, carpenters and cabinet makers, chauffeurs and garage men, metal workers, welders, draftsmen, electricians, tailors and sailmakers, watch-makers and instrument workers, painters, plumbers, and a variety of other kinds of tradesmen, as well as the necessary number of clerks and cooks.

To train these men and adjust their skill to the repair and manufacture of aeroplanes was the immediate task of the Government Air Service. A good deal was accomplished by the establishment of enlisted mechanics' training schools, enlisted mechanics' training schools, where the men were given short intensive courses in aeroplane engines, wing and fuselage construction, as well as in aero-plane nomenclature. These men were formed into repair squadrons and shipped tormed into repair squadrons and shipped to various points for duty or further training. The squadrons which came to the Indianapolis Depot were carefully trade-tested to record their experience and skill in certain lines, and were then put to work at the jobs best suited to them; where the square the squar These shops them in the repair shops. had their several departments devoted to all the various kinds of aeroplane work Automobile motor men quickly learned the construction and operation of aeroplane engines; carpenters and cabinet-makers were shown how to apply their skill to the making of longerons, struts, skids, wing sections, and other wood portions of the aeropiane; metal workers learned how to fashion the small metal parts, tailors were taught how to sew the parts, tailors were tailed now to sew the linen on the wings, painters were quick to learn the knack of applying dope var-nish to the finished wings and the body of the plane, and so on. Enlisted men of various trades were thus utilized, each for work in his own line, in renairing and rebuilding machines with which they had had no previous experience. Under careful instruction and supervision this body of green aeroplane mechanicians developed into expert workers, producing for into one depot alone a daily output of engines and aeroplanes that would have

THE AERIAL CARNIVAL AT FORT OMAHA

A N aerial carnival was held at the Fort Omalia Balloon School on July 13 for the purpose of stimulating recruiting in the balloon section of the Air Service.

The main events of the day was the balloon race, of which a summary follows:

Balloon No. 2, "All America," First Lieut, Richard E. Thompson, pilot; Secoud Lieut, James B. Jordan, aide; Jeft at 8:52 P.M., 13th. Landed 9 miles southeast of Portage, Wis. 145 P.M. 14th. Maximum altitude, 12,500 feet. Time in air 16 hours and 33 minutes. Distance traveled 409 miles. First place.

traveled 499 miles. First place.

Balloon No. 1, "United States," Captain
Ashley C. McKinley, pilot; Second Lieut.
James T. Neely, adic; left at 8:88 P.M.
Joh. Landed 6 miles south by west of
Rowley, lowa, at 12:01 P. M. 14th.
Maximum altitude 9,000 feet. Time in
air, 16 hours and 3 minutes. Distance
traveled, 136 miles. Second place.

travered, 100 miss. Second piace.
Balloon No. 3, "Victory," Second Lieut.
William E. Huffman, pilot; Second Lieut.
William E. Connelly, aide; left at 8:55
P.M., 13th. Landed at 1:20 P.M., 14th.
Maximum altitude 7.200 feet. Time
air, 16 hours and 25 minutes. Distance

air, 4th nourt and c, minutes, state of the Balloon No. 4, "Canton Ball," Mr. A. Lee Stevens, pilot; Lieut. Col. Jacob W. S. Wuest and Major Marin J. O'Brien, asdes; left at 9:00 F.M., 13th. Landed A.M., 14th. Landed G.600 Feet. Time in air, 6 hours and 45 minutes. Distance traveled, 158 miles. This balloon condition of the desired from the condition of the con

batton No. 4, Cannon Bail, entered terrific thunderstorm at 2:10 A.M. Encountered cyclonic winds over Minnesota Lakes and forced southeast, and finally beaten to the ground at 3:48 A.M.

Other balloons encountered same storms, but were apparently at their outer edge, so continued the race.

Balloon No. 2, "All America," won a silver loving cup and the pilot and aide were awarded gold wrist watches donated by the Omalia Chamber of Commerce and the Board of Governors of the Ak-

and the Board of Governors of the Ak-Sar-Ben Club of Omaha. Balloon No. 1, "United States," and Balloon No. 3, "Victory," won scond and third prizes, respectively, consisting of silver cirgarette cases appropriately engraved for the pilots and aides.

The prizes were presented in person by Colonel C. De Forrest Chandler, chief of the Balloon and Airship Branch, Air Service, at Fort Omaha, on July 22, 1919. Lieut. Colonel Jacob W. S. Wuest, J.M.A., A.S., M.A., commanding officer, presided at the ceremonies.

The hearty co-operation accorded it by the officers and men of the post and by the leading business men of the city of



The official announcer at the Aerial Carnival at the Fort Ohama Balloon School was suspended 100 feet in the air from a captive

Omaha insured the overwhelming suc-

Official Institute Constitute of the Carnival.

Due to efficient organization the various committees performed their plans without hitch. The scope of their activities may be judged by the following list showing their organization and membership:

Commanding Officer-Lieut. Colonel Jacob W. S. Wuest.

Adjutant-Major Martin J. O'Brien.

Adjutant—Major Martin J. O'Brien.

Director of the Carnival—Mr. A. Leo
Stevens.

Grounds and Property—Major R. T. Crawford, Second Lieut, R. S. Hall. (a) Decorations—Captain C. R. Jacobson,

Second Lieut. W. E. Connolly. (b) Construction—First Lieuts. W. C. Burns and II. C. MacNeill. (c) Reception and Entertainment—Captain A. C. McKinley, Captain S. L. Dowd.

Balloons—Second Lients, R. A. Reynolds, W. E. Huffman, R. Robertson. Athletics—Second Lieuts, J. O. Tooley

and Mr. D. J. Ryan.

Transportation and Traffic—Captain C.
F. Adams, Second Lieut. R. P. Clapp.

Refreshment and Concessions—Second Lieuts. G. G. Lundberg, R. G. Conklin and J. B. Jordan.

Publicity—Major M. J. O'Brien, Second Lieut. J. T. Neely, Mr. A. Leo Stevens.

Recruiting—First Lieuts, R. E. Thompson, J. M. Riggs. Contests and Records—Second Lieuts.

Contests and Records—Second Lieuts.
C. L. Meisinger, A. H. Foster.

Police and Fire Protection—Captain

 T. Lewis.
 Program—First Lieut. H. C. MacNeill, Second Lieuts. J. T. Neely, G. G. Lundberg, W. E. Connolly and Mr. A. Leo

Stevens.

Athletic Events—Starter, Second Lieut.
J. O. Tooley: judges, Second Lieuts. J.
R. Hall, H. S. Froehlich and Mr. D. J.

J. O. Tooley: judges, Second Lients, J. R. Hall, H. S. Froehlich and Mr. D. J. Ryan.
It is estimated that over 25,000 people

It is estimated that over 25,000 people witnessed the carnival, and all the events went off smoothly and according to the program, in spite of the high winds.

An added attraction was the appearance of two aeroplanes from the hangars of the Omahaa Flying Company, which circled the field and took pictures of the events from the air. Moving pictures were obtained of the olineers who participated in a chained of the olineers who participated in These pictures were all displayed at local theaters throughout the following week, the audiences showing intense interest in them and applauding heartily.

600 Mile Balloon Flight

Post Field, Fort Sill, Ökla.—Pilot Licuttenant Hoke S. O'Kelly, with Licutenants Carlton F. Bond and William H. McIlwain, and Sergeauts Louis N. Morris and Edwin Schneider as passengers in a 35,000 cubic feet tree halloon, made a flight from Post Field to Lewington, Neb. 600 miles, in 31 hours. Maximum altitude 5,400 feet. Five landings made en route.



From left to right, Cacquat observation balloon, German Drachen, nursa balloon, Italian A. P. observation balloon. The small balloons in the

TESTS ON THIN PLYWOOD AS A SUBSTITUTE FOR LINEN IN AEROPLANE CONSTRUCTION

By ARMIN ELMENDORF*

THE use of thin sheets of wood prop-erly glued together in place of linen for aeroplane covering has long been considered as a possibility. Veneer of some species may be cut into large sheets only 1/150 inch thick. When three sheets of such thin material are glued together, a covering is obtained whose weight compares quite favorably with that of doped pares quite ravorably with that of doped aeroplane linen, so that there is some reason for considering wood as a material for covering, although at first thought it might seem to be out of the question on account of its apparent excess weight,

account of its apparent excess weight.

In view of the frequent demand for information upon the properties of thin
plywood and its uses in aeroplane construction, tests were initiated at the Forest Products Laboratories of the U. S. Forest Service, at Madison, Wis., to determine the merits of thin plywood as a twas possible to prepare very thin sheets of three-ply wood that would be as light as doped linen, a few attempts at gluing such material soon showed that the difficulty of handling the veneer made the

* Engineer in Forest Products, Forest Products Laboratory, U. S. Forest Service, Madison, Win.



Figure 1 Method of measuring the toughness of this plywood shoets by dropping a 3.27 pound from ball upon the center of the test specimes



Figure 3 Measurement of rigidity by the magnitude of the load on a given deflection, determined by

manufacture of plywood of this kind immanufacture of plywood of this kind im-practical, at least in the present stage of the plywood industry. A few tests also showed that very thin plywood lacked toughness and tearing strength, and there seemed to be little hope of using the lightest plywood. The tests were, there-fore continued on somewhat thicker material with the surmise that the heavier plywood might possess other properties that would compensate for its excess weight.

The relative importance of the various properties desired in an aeroplane covering is not established. Each of the following properties is, however, of sufficient consequence to merit consideration: (a) Minimum weight consistent with safety; (b) high tensile strength; (c) high toughness, or resistance to blo tending to rupture the covering; (d) high tearing strength; (e) high rigidity, or minimum stretch under load; (f) maxi-mum stability; (g) resistance to fire. Tests made by many experimenters with

the use of a variety of chemicals have shown that wood may be impregnated with solutions that render it highly fireresistent; consequently, no special work was undertaken to treat thin plywood for this purpose.

Tests were devised to measure the quality of the material in each of the other properties mentioned above, and the results, obtained from more than two thousand such tests, are here briefly considered.

glued at the Laboratory by the tissue process, in which a sheet of tissue, previously soaked in blood-albumin glue and dried, is inserted between two sheets of thin veneer and then pressed in a hot press to set the glue.

Among the species that may be cut into very thin veneer are Spanish cedar, mahogany, birch, sugar maple, red gum, yellow poplar, and black walnut. The torily glued by the tissue method.

Three constructios of thin plywood were prepared: First, a three-ply con-struction in which the grain of the cen-ter ply was at right angles to the grain of the face plies; second, a construction in which a piece of cloth was incorporated between two veneer plies having their grains at right angles; third, a construction in which a piece of cloth was glued between two plies of veneer, whose grains made an angle of 60 degrees with each other

The weight of aeroplane linen given five coats of dope at the Laboratory was about 0.9 ounce per square foot, while the minimum weight of three-ply Spanish cedar made of 1/150-linch veneer was about 1 ounce per square foot. Thin plywood constructions that were considered satisfactory from the point of view of facility of manufacture and with reousand such tests, are here briefly con-lered.

spect to strength and toughness weighed slightly more than 2 ounces per square Practically all the material tested was foot. In constructions of this kind a sheet of cotton cloth was glued between two sheets of this veneer, the thickness of the veneer used being about 1/60 inch for low-density species, such as basswood, Spanish cedar, and yellow poplar. For high-density species, such as birch, beech, high-density species, such as birch, beech, about 1/80 inch gives a plywood weight of from 2 to 2.5 ounces per square food. A large part of the weight of thin plywood lies in the glue.

Tensile Strength

Strips one inch wide were tested in tension, their ends being held between flat grips, in an ordinary Olsen testing that grips, in an ordinary Olsen testing the strips of the strips of

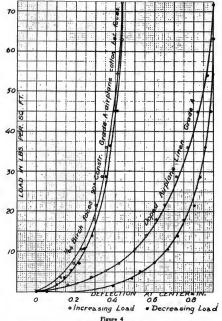
angles between the grains of the faces. A two-ply construction in which the grain of one ply makes 50 degrees with the grain of one ply makes 50 degrees with the face of the grain of each face, which is practically equal to that of the single ply of veneer. The tensile strength in the direction of the grain of each face, which is practically equal to that of the single ply of veneer. The tensile strength of sirring that the grain of the veneer than the grain of the veneer than the grain of the veneer than in the direction in which the tests were

Tonebass

In addition to being strong in resisting a tensile load slowly applied, aeroplane covering must also offer resistance to sudden blows, such as would result from striking brush on landing or dropping tools while assembling or repairing the machine. The method used by the Laboratory for measuring the toughness of



Figure 2
Apparatus for simulating whipping action to test the tear in an aeroplane covaring ruptured by a projectila



Load deflection curves. Sand load tests on plywood panels. Panels tacked on frames

18" x 16" inside dimensions

thin plywood sheets is shown in Figure 1. A cast-iron ball weighing 3.27 pounds is dropped upon the center of the test sections, which is tacked upon a frame life inches square inside. The state of the part of

The tests showed conclusively that very timi three-ply wood, such as that made of Spanish cedar veneer 1/150 inch thick, is low in toughness, and for that reason time. In order to improve the toughness of thin plywood made of veneer thinner than about 1/50 inch, it was found necessary to incorporate a cloth fabric between the plies. Aeropiane control for this purpose to be very satisfactory for this purpose to be very satisfactory for this purpose.

Tearing Strength

When ruptured in flight by a projectile an aeroplane covering may develop a serious tear, especially in the slip stream of the propeller, where it is subjected to the propeller, where it is subjected to the thought that such repeated stresses could be simulated by the whipping action of the apparatus shown in Figure 2. The test sheets were fastened in a wooden mitted a cam mounted on a motor shaft contained the subject of the frame and litest under test being supporting at 1200 r.p.m., the weight of the frame and litest under test being supporting and 1000 r.p.m. the weight of the frame owner of the frame to whether or shake in its guide so that the cam tore a gap in the plywood, that the cam tore a gap in the plywood, the came of the subject of the frame to whether the subject of the frame to whether or shake in its guide so that the cam tore a gap in the plywood, the subject of the subject of the subject of the materiality tearing resistance of the materiality tearing the subject of the subject of

The very thinnest three-ply wood made (Continued on page 1147)

1137

PRELIMINARY NAVAL FLIGHT INSTRUCTION

By NICHOLAS S. SCHLOEDER

(Concluded from page 1057)

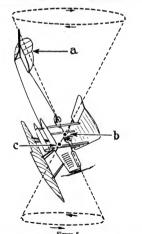
C PINNING nose dive is a broad term, applied to all manoeuvers which include a rapid descent, nose down, accompanied by rotation about an axis more or less coincident with the fuscing. This includes a tailspin, though in this country, there is a tendency to restrict the term to convolutions in which the axis of the machine is perpendicular and the descent and spin very rapid. There is unquestionably a distinction, involving certain peculiarities about a common

principle The three underlying principles of spins involve torque, the

screw effect of divergent surfaces (rudder and elevator out of neutral), and the use of ailerons. Any or all of these may be included. The first two are the prime factors in a tailspin,

be included. The first two are the prime factors in a tailprin, the last, of a spinning nose divid (in the narrow sense). Loss of speed induces the first, speed the last one, of speed induces the first, speed the last one, or speed induces a speed induces a speed induces a speed of the speed in a direction opposite to that of the propeller, with the propeller shaft as the axis. Now when loss of speed occurs, as machine starts to turn and rotate to the left. This is a common experience with power loops. Hence, climbing unduly on left turns, followed by a loss of aerofoil function, directly some captures with power loops. Hence, climbing unduly on left turns, followed by a loss of aerofoil function, directly will assist. Whence all ordinary machines spin faster and easier to the left, especially with soots with slow-speed motors of proportionately greater torque. While torque is thus merely a contributing factor, it is yet largely responsible left.

Briefly, the theory of a true tailspin lies in the screw action of divergent or off-set tail surfaces. In other words, the elevator is pulled back and the rudder is hard over, The action of the elevator and rudder is as follows: The ele-



vator function at first is very similar to that resulting from a stall, that is, if we eliminate the effect of the raised elevator as the stall of t fore mentioned, the center of gravity moves in front of the center of lift; hence, the cleavator has more work to do, with less power of doing it, because the reduced speed diminishes its action. Consequently, the nose of the machine drops suddenly. Now, when the nose drops, speed is quickly regained, restoring the leverage of the elevator, which ordinarily, would again raise the nose. Another factor, however, prevents this, namely, the rudder.

A vertical keel surface is necessary for elevator action, oth-A VEHRAI RECESSIFIACE IS INCCESSARY FOR CHEVACO ACTION, Otherwise the tail might slip off one way or other laterally, under stress. Hence, when such a keel plane surface is divergent, in the form of rudder "hard over," not only is the neutralizing effect of the prevention of lateral slip negatived, but it will give the direction of that slip. This actually happens, for it becomes easier for the elevators to slip off to one

pens, for it becomes easier for the elevators to slip off to one stige, directed by the rulder, than it does to lift the nose, a spinning mention being hereby imparted, as a self-evident. on by a set of opposing forces whose operation may be com-pared to a lever, the fullerum being the center of pressure on lift of the man planes, with the elevator on one arm tending to lift the nose, while on the other the center of gravity holds it down; a dual decided by the rudder in Lavor of gravity.

at down; a cliai decided by the rudger in layor of gravity.

As a practical matter, any position with elevators raised, rudder over, will result in a spin. The simplest way to spin is to throttle the engine, holding machine up, slowly pulling back controls to chest and then applying hard rudder. Some DASA CONTROLS to cness and then applying hard rudder. Some pilots first go into a stall, with or without power. Too much down rudder on a "flipper" turn or spiral will also cause a spin. Loss of speed where torque is involved will likewise contribute. Loss of speed is never otherwise the direct cause of a spin, as is sometimes erroneously supposed, but merely

Neutralization of tail surfaces will immediately stop all normal spins. Only where torques or ailerons are involved, will any further action he necessary, such as ruddering against. In flat spins, rudder against. In accidental spins to left, cut spark. If from flipper turn or spiral, release wheel momentarily, which will neutralize ailerons. Always neutralize elevator, never more,

valor, never more.

A spinning oil ve, in the narrow sense, is applied to a
A spinning near spin which may be the result of several
contributing factors. As will be seen by examination of diagram, the greater the relative force of the tail surfaces, the
flatter will be the spin. Therefore by easing off on the tail
surfaces, the descent will be made more precipitate. If at this surfaces, the descent will be made more precipitate. 1) at this time alternols be used with the spin, this acts as a serew about a time alternols be used with the spin, this acts as a serew about at the toose. Hence this tends to keep the nose down, and likewise more than compensates for loss of rotating moment. In practical flying, a spinning nose dive often results from a "flipper" serial, as the alternols are held over. By alternomes

with any ordinary spin, a spinning nose dive may be produced To come out of it, it is necessary to add one feature to the ordinary practice of a neutralization of tail surfaces, i. e., by momentarily relaxing hold on the wheel the ailerons neutralize themselves at once. Pressure on ailerons may be very great in a spinning nose dive; indeed it is an effort to hold them

Taxing On Water

Ability to manoeuver machine while in the water, partleu-larly upon the final return to the beach, is of great import-ance. Indeed, collision with other machines along the beach is responsible for more minor breakages than any other mishap. The rules are simple, yet confusing.

If the approach to the beach involves, a head wind, the con-

trols are used quite as in ordinary flight, though with greater radius. If the wind is more or less parallel to the beach, and in order to keep machine on desired course it is necessary to turn nose to the windward, simply throttle engine. The machine acts as a weather-vane and swings into the wind. To turn nose to the leeward, open throttle and apply rudder as usual. Never attempt to turn into wind by aid of rudder with power on. Furthermore, it is desirable in such cases to approach beach from leeward side. If a tail wind prevails, greater than the speed of taxing, reverse control becomes necessary. Hence, in right turns, give left rudder; the wind catches the rear of the rudder surfaces which swing tail to left. Similarly to raise nose in choppy water, throw yoke forward as the wind strikes the upper surface of the depressed elevator and lowers the tail.

Ailerons assist in manoeuvering on the water. When machines are equipped with wing tip pontoons, ailerons are used to immerse pontoon on side toward which it is desired to turn, which thus acts as a pivot for a rapid turn. With en-

gine throttled, always use reverse control. gine inrottied, always use reverse control.

Generally speaking, it is easier to turn to left than right
because of torque. Approach beach as slowly as practical.

Never head toward beach while still on the step, unless at a
considerable distance. When leaving beach, proceed gradconsiderable distance. When leaving beach, ually: do not throw blast back on bystanders.

Flying Boats

Before concluding these remarks I will take up the special

peculiarities of flying boats.

The differences of boat control is due to the peculiar distribution of the centers of lift, gravity, thrust and resistance It is exactly the reverse of that in tractor machines, and, theoretically, with the possibility of engine failure present, it is a more unstable arrangement. The center of thrust is above the center of resistance, the center of gravity behind the cen-

With power on, it can readily be seen that the first com-pensates the second, for the high thrust tends to depress the pensates the second, for the fingh thrust tends to depress the noise; the centre of gravity to raise it. Now, with power off, this heavy tail condition is neutralized by a lifting tail; hence the necessity of throwing the controls forward and holding them in a glide. Where bank is involved, there is a tendency for the noise to come up, as may be assumed, since the high thrust no longer acts directly downward, but at an angle. Therefore "down moder" can be used with greater freedom. with steep turns than in the operation of tractor machines.

Another peculiarity is the balanced ailerons which makes

Another peculiarity is the balanced ailerons which makes their operation easy and which leads to overcontrol by the pilot. Furthermore in taking off, there is the sharp swerve to the left which the boat makes as it goes on the step and the tail fits out of the rudder. This is only momentary and is tail fits out of the rudder. This is only momentary and is The difficulty of F-boats is constituted largely by their difference from tractors, and not to an inherent complexity of operation. In fact, landings are easier for beginners, and I have succeeded in qualifying with them for solo by a measurably shorter period of instruction than with N93. Left Students must be taight to operate F-boats from the theory of the students of the control of the control of the control of the through which is the control of the

seat. The advantages of this are: (1) They may operate the throttle with the right hand, as customary: (2) Most instruments are on the left side, particularly, when later, they operate H-boats; (3) The fault of climbing on left turns is practically eliminated, as the student is on the inner and lower side when turning; the outer side of the bow above him tends to make him keep the nose down. The opposite is true of right hand turns, as he is then on the outer and wpper side, but in this case a low angle of incidence is not so necessary; (4) As he bow of the machine slopes slightly so necessary; (4) As the low of the machine slopes signify from the center, there is a tendency among boat pilots to lower the wing on the opposite side; if the right wing is low it is more advantageous than the other, for, as before explained, the slight side slip compensates for torque and

explained, the slight side sup compensates for forque and decreases the strain on right rudder.

The Aeromarine has an unusually high effective angle of climb, but the speed at such angle is very low. Consequently, the tail surfaces are not very effective, which leads to careless work, particularly with the rudder, which, shoved hard over, may lead to a spin. Otherwise I have discovered no particularities.

Care of the Machine

In conclusion, I migh state that the care of machine, knowl-In conclusion, I mign state that the care of machine, knowledge of engine and detection of trouble; safety measures, such as examination of controls before flight, acquaintance with rules of the course; a constant lookout for other machines; the technique of the instruments, aerography, etc., are matters of vital importance. However, I haven't eluciare matters of vital insportance. Proveer, I navent elucated them as the strict compass of this paper aims to be nothing more than a treatise on actual flight instruction. Local conditions modify rules, and the student is referred to motor men and technicians for other points. Nor have I discussed the difficulties of aerial archabitcs, as I believe they are not within the compass of preliminary instruction.

A COMPENDIUM OF MISTAKES MADE BY STUDENTS In Take-Offs

(1) In taking off, most students held controls forward too

long after they had succeeded in getting the machine to plane on the step, which thereby caused it to "porpoise."

(2) Many students attempted to arrest a porpoise by move-

ment of the elevators, instead of by withdrawing them to neutral

(3) Many students dragged machine off water before it had attained sufficient flying speed, by holding controls too far back, which resulted in a series of bounces and the assumption of a dangerously high angle of climb upon finally taking the air, which at times almost resulted in a stall.

(4) Many students attempted to rock machine on the step y a vigorous movement of yoke back and forth, instead of a slight movement about neutral in rythm with the natural rock

of the machine.

(5) All students have permitted wing tip pontoon to bury itself in the water when attaining step, which caused machine to swerve in its direction, and therefore out of the wind. (6) Most students underestimated the amount of rudder

control necessary before attaining step, which is considerably greater than that needed while planing or in flight.

(7) Many students after landing, and I had opened the

(7) many students after landing, and I had opened the throttle to proceed, loss sight of fact that the machine had not settled into water, but was still planing on step, so that when they threw yoke forward as if to attain the step, the nose was depressed suddenly and dangerously.

(8) Most students failed to hold their course in straight flight until after some experience, and permitted machine to swerve gently to left because they did not maintain present sure on right rudder consistently

(9) Some students on the other hand, held right rudder too steadily; hence did not have the much-needed flexibility in rudder action, which resulted in yawing.

(10) Many students flew with right wind low, because of insufficient right rudder; some with left wing low, because of too much right rudder.

of too much right rudger,

(11) Many students attempted to affix certain point on
rocker arms or machine and "line it up" with horizon. Too
much reliance on this led to great confusion in absence of
a clearly defined horizon, when obscured by mist.

a ciearry denned horizon, when obscured by mist. (12) A common method of confusing horizon occurred as students approached mainland from the sea. They confused the edge of the shore with the horizon; hence, as they approached land, the nose dropped and the angle of climb decreased until it left below normal.

decreased until it lell Denow normal.

(13) Some students interpreted injunction to nose down in rough weather to mean sudden movement of elevator controls. "Bumps" should not be "fought." A slow depression of nose while passing through adverse currents was all that

was necessary. (14) Most students over-controlled in flight; some were sluggish in control.

In Turning (15) In first using the rudders a few students had difficulty in getting away from the bob-sled idea of foot-bar action, which is opposite to that in "Dep" control.

(16) Most students began turn by use of too much control, particularly the rudder.

(17) Skidding on a turn was far more common than slipping, particularly when to the left.

(18) Most students, when over-control had precipitated them in a sharp turn, alleroned hastily against the turn, ignoring the rudder, so that machine leveled out laterally in a decided skid. On straightening out the rudder, the turn tame to an abrupt ending, before the desired change in direction was achieved.

(19) Nearly all students, because of haste in beginning turn, have, because they found it necessary to correct over-control, by controlling against turn, failed to turn as rapidly and smoothly as they would had they began the turn more cautiously.

(20) Many students, instead of depressing nose slightly before turn was begun, and keeping it at the initial degree of depression, did so after turn was started, until nose was below necessary angle. The nose of machine was thus alternately too high and too low.

In Landing

(21) After engine was throttled or died, many students did not assume gliding angle quickly enough. On the other hand, a few jerked controls forward unnecessarily.

(22) Leveling off too late was as common as leveling off too soon, and much more unwise.

(23) More students leveled off too much than too high. (24) All students, on final contact with water, failed to have controls back enough, a cause of the great majority of imperfection in landing.



NAVAL and MILITADY · AERONAUTICS ·



Experimental 24-Cylinder Liberty Engine Tested

Washington, D. C .- A short test of a 24-cylinder Liberty X-type motor has been conducted at McCook Field. The test engine was built of standard Liberty 12 parts. The changes involved were 12 parts. The changes involved were few, consisting in the main in the use of two regular crank case upper halves, one of which was somewhat altered, and special design connecting rods.

The following table compares the Lib-

erty 12 and the experimental Liberty 24:

Horsepower (normal)—	
Liberty 24 673	
Liberty 12 400	
Pounds per H.P. (dry)-	
Liberty 24	
Liberty 12	
Gas consumption (pound per	
H. P. hour) -	
Liberty 24	
Liberty 12	

The experimental Liberty 24 compares favorably with successful tests of foreign tavorably with successful tests of foreign motors of approximately the same power. An engine of this power, if run at the normal speed, would enable the use of a comparatively large slow-speed propeller without gear reduction, thus increasing propeller efficiency.

The following table compares the Liberty 24 and various high-powered foreign motors :

Motor	Vountry of manu- facture	Rated horse power	Weight per h. p. (pounds)
De Dios	France U. S.	800 673-738*	2.15
Fiat A-14 Rolls-Royce "Candor"	Italy England	600	2.36
Anzani 20	France	600 550	
Salmson 18-Z Napier "Lion"	France	500 450	1.76

^{*}Experimental, not rated.

Inactive R. A. M.'s Permitted to Fly in Government Aircraft

Washington, D. C.—The commanding officer at any Air Service station where flying is authorized may permit qualified Reserve Military Aviators, who are in inactive status, to take such flights in Goyernment aircraft as he deems advisable. Cross-country flights will not be made under this authority and no interference with the regular training or the operation of a station will be permitted.

Before exercising the authority given them in preceding paragraph, commanding officers of Air Service stations will be held responsible that the following conditions have been fulfilled: (a) That individuals applying for such permission have fully and completely iden-

tified themselves-documentary evidence being required when necessary.

(b) That such individuals have demor

strated to the Flight Surgeon that their physical condition is satisfactory for solo

flights.

(c) That no applicant is permitted to fly solo until he has been reported by a qualified instructor as competent to do so after an actual test in the air.

The foregoing restrictions have been Summary of Status of Army I unit of the experifound necessary as a result of the experience gained to date relative to flying enence gained to date relative to flying en-gaged in under authority of Orders No. 30, D. D. A. S., 1919, which has been re-scinded by this order. Commanding offi-cers are directed to observe the spirit as well as the letter of these instructions to the end that Government property may of over-enthusiastic pilots in poor physical condition, or whose flying efficiency has been lowered by too long an absence from flying, be needlessly endangered.

Flying Permits from Army and Navy Board of Aeronautic Cognizance No Longer Required

Washington, D. C.—The War Depart-ment authorizes publication of the follow-ing from the office of the Director of Air Sarvice

The President has revoked his procla-The President has revoked his procla-mation making it necessary for all civilian fliers to apply for flying permits to the Joint Army and Navy Board of Aero-nautic Cognizance. As legislation in con-nection with internation aerial regulations is pending in Congress concerning the is-suance of flying licenses, it is not believed by the Army Air Service Joint Board that it is necessary or practical for municipalities or states to issue flying licenses until

a national standard liceuse is authorized. Souther Field Personnel Ordered to Texas

Americus, Ga,-According to the local press orders have been received at Souther Field for the transfer of 121 enlisted men now stationed here to Ellington 140 officers and men now stationed at the field, this order means the virtual aban-document of the post.

Washington, D. C.—The Air Service reports a total of 9,204 planes in the United States, 88,9 or 9 per cent, of which are in commission. The table shows the status of these planes as of August 7. The total does not include planes already delivered to concentration points for declivery to the Curriss Corporation. The titem in reserves includes alongs of all the properties of the concentration points for declivery to the Curriss Corporation. The item in reserve includes planes of all types, foreign and domestic, in storage

ind at depots;		Per cent.
Status	Number.	of total.
n reserve	. 7.369	80
out of commission	. 977	11
n commission	. 858	9
Total	9.204	_

3.162 Reserve Officers in Air Service

Washington, D. C.—Of the 15,646 commissioned officers discharged from the air service, 1,638 flying and 1,524 non-flying officers have entered the Reserve, a total of 20 per cent of the number discharged.

Air Service Demobilized 91 Per Cent Since November 11

Washington, D. C .- The Air Service reports a net decrease in strength to August 7 of 91 per cent.

The following table shows the present distribution of personnel as compared with that of November 11. The August 7 figures do not include 505 officers in transit or at demobilization camps awaiting discharge:

Cadeta Enlisted men Officers	167,986	Aug. 7 3 13,562 3,426	% net 6 99.1 92 83
Total	195,023	16,991	91



Participants in the h right: Lieut. Connot Mejor O'Brien, Lieut. balloon race, the feature of the Fort Omaha Aerial Cornivel, from left to olly, Lieut Huffmen, Mr. A. Leo Stevens, Lieut.-Col. Jacob W. S. Wuest, it. Thompson. Rear row: Capt. McKinley, Lieut. Neely, and Lieut. Jorden



FOREIGN NEWS



Aeropiane Landa on Jungfrau

Berne—Aviation Lieuteant 'Alermann, accompanied by Major Ialer, effected a landing on the summit of the Jungfrau on August 18. The point where their biglane was to have landed was marked by the where the biglane was to have landed was marked by fell in deep snow 100 yards away from the landing place. The aviators were not burt. The aviators were not burt.

Perfect Record for Dally Blackpool-Manchester Service
Blackpool, Eng.—The daily passenger service between Manchester
and Blackpool has run daily for three months without a forced landing.
The fare is £4 48 single and £9 % return flight. During the last week
in July over 1,000 passengers were taken up at the Blackpool Aerodrome.

Farman Enterprise

"Paris—The following advertisement appears weekly in the Paris
"The the Religion Parison," Ferre by descriptor.

"The the Religion Parison," Ferre by descriptor.

"This work the Golds will leave for Brussels as award on Turnday
"This work the Golds will leave for Brussels as award on Turnday
the cause of the Control of the Control of the Control

"This work the Golds will leave for the Control

"Meever, Farman key to amount of the Golds will be are
influented by the Golds, they can place at the disposal of business men
insonaires for parties of at least four passequers at the rate of 2 country by the Control of th

Scotland-Norway Service Planned

Major Galpin, R. A. F., has arrived in Norway to negotiate with the Norsk Luftfartrederei and a British company to establish a passenger service between Scotland and Norway.

School of Military Aeronautica in Brazil

Rio de Janen-The French acronsule missions seeded by Coloral Magnia are insupurating a school of Military Aviation at Affonsos. Fifteen pilots will act as instructors.

There will be two courses; one for army pilots' license and one school with the two course; one for army pilots' license and one school with the rank of sergeant. The facilities and equipment for instruction purpose at the school are of the best.

Sir Hugh Trenchard Receives Baronetcy

London—In 'recognition of the great services rendered during the war in connection with Royal Air Force during the war. His Majesty, King George, has conferred a horonetey upon Air Vice-Marshal Sir. H. Trenchard, K. C. B., D. S. O. A bounty of £10,000 has also been recently given Sir Trenchard.



England is ready for civillan aeronautics. Aerod lished at every paint on the map romes are estab

Air Farce Personnel Slightly Reduced

London-A parliamentary paper recently issued showing the person of the staffs of the various Ministries, gives the following figures the Air Force: November 11, 1918. 4,040; March, 1919. 4,090

Turin-Rome Record Broken by Sia Mach

The aeroplane record, with passenger, from Turin to Rome, was broken on just Jelb by Liestenant Brack-Phys, flying the Fait BR hiplane equipped with a Fait 700 b.p. 12-cylinder engine. The distance of Job miles was covered in 2 bours 15 minutes, this groung an over this route was 2 hours 50 minutes, established by Sergt. Stoppani on a Sia machine.

Sir Herbert Austin Decorated by King Albert

The King of the Belgians has conferred the title of Commandeur de l'Ordre de Leopold II upon Sir Herbert Austin, Managing Director of the Austin Motor Co., Ltd., in recognition of "constant and generous belp given to this country in the course of the war."

Airship Control Turned Over to Air Ministry by Admiralty

London-According to announcement made in Parliament by Bonas Law, it has been decided to place the control of airships under the jurisdiction of the Air Ministry instead of the Admiralty.

Conditions of \$50,000 "Daily Express" Contest

Conditions of 800,000 "Duly Express" Contest:
Leading that the Atlantic has been bridged to in both
becomes the the Atlantic has been bridged to grove the
prescrability of commercial flying within the Engire.

The Atlantic that the Atlantic that the Commercial flying within the Engire that this to little the custying portions of the Empire uno infinitely door!

Americal has defered a similar price to the first atlantic that the Commercial flying and the Commercial flying the Commercial flow of the Commercial that with South Africa and Iolds. That task the Duly Engine propose to carry out.

Conditions In general, the terms and conditions of the £10,000 competition may

(a) All types of aircraft are eligible for entry.

(b) The competition is open to all the world, except late enemy countries. (c) All aircraft entered must carry a useful load of at least a ton both on the outward and homeward flights.

(d) Each entrant must produce one aircraft for the flight to and from South Africa, and one aircraft of a similar type for the flight to and from India.

(e) The factors considered in the award will be:

Average reliability, Airworthiness and general conduct of aircraft entered. Average gain in speed over the established means of transport.

(f) As the aim is that each aircraft shall carry a useful load of adeable or exchangeable commodities or raw materials, it will be to the advantage of competitors to study the comercial aituation as affecting this interchange.

(g) Particulars of entries will be announced within the next few

(h) Competitors may undertake the flights at any date between the closing of the entries list, which will be announced later, and June 1, 1920. Priority in completion will not prejudice the success of later but obviously more efficient performances.

(i) One complete failure by a competitor will involve disqualifica-tion for the sward.

Further instructions as to the particulars and conditions of the competition will be announced later. India and South Africa

Peculiar importance is attached to the flight to the East, for these

ona:

(a) The vast potential possibilities of India commercially to the

(a) The vast potential possibilities of India commercially to the Engineer of the Control of the

World's Altitude Record with Passenger Again Reported Broken Paris—A new world's attitude record of 30,000 feet is said to have been established for an aeroplane with passenger on August 13 by Lieut. Weiss, the pilot, and Mechanician Begue, according to the newspaper

Weiss, the pure, which took 52 minutes, was made at Villacomblay, near The first which took 52 minutes, was made at Villacomblay, near here. The availars' instruments aboved that they experienced a tem-perator of more than 25 degrees below zero. The official figures on the ascent will be made public later.



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F MSMahon 200



PACIFIC NORTHWEST MODEL AERO

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8730 Ridge Boulevard, Bay Ridge, Brookly
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Illinois Model Aero Club Note

By W. E. Schweitger

THE Illinois Model Aero Club hand-launch duration contest was held Sunday, August 3, at Ashburn flying field. The weather was very threatening and twice the models were put away to avoid being wet by the passing clouds. The contest was another of the series for the Laird Weaver

The contest was another of the series for the Laird Weaver trophy which is awarded each year to the club member hav-ing the highest average for the season. The cup was first won by W. D. Pease in 1916, next by W. R. Sprague in 1917 and last by W. E. Schweitzer in 1918 and in whose possession it is now

The best duration of the day was made by W. E. Schweitzer, 133 seconds, W. D. Pease next with 114 seconds and E. C. Cook third with 89 seconds.

The results were as follow		- Seconds -	
J. J. Lucas	55.8	11	8.6
W. D. Pease	1.2	111.2	114
W. E. Schweitzer	105.2	133	129.4
W. Wrixon	5.6	25	22.2
E. C. Cook	89	0	0
H. Wells	26.2	40	22
R. Jaros	37.4	72	6.4
0 1 1			

Several others were also out but without models.

A number of large machines were also flying, some with

A number of large machines were also flying, some with passengers at \$25 a hop, but most of them were just out for a spin. Buck Weaver, an old member of the club, left during high and Cleveland the next day.

W. E. Schweitzer made several attempts at the R. O. G. distance record, but the longest flight, 3,034 feet, was 330

feet short.

The next contest for the club will be R. O. G. duration on August 17 followed by another hydro meet on Labor Day, September 1.

The Halford Aero Motor Constructed by Harry Herzon

FTER reading Mr. McMahon's article on the construction of the Ford aeroplane it encouraged me to see if it was not possible to design a motor within reach of everybody's means.

The motor is strictly Ford as to compression valve area and timing; the pistons are aluminum with special rings lapped to perfect fit; the rods are standard type grooved for better oiling; they have a specially constructed dip which is the future of the lubrication of the entire motor; the cooling is thermo-syphon; the crankcase is special and contains one gallon of oil; the carburation is taken care of by a special carburetor for high speed work, and has given perfect results.

The ignition is Bosch magneto. There is an oil gauge for the crankcase level and the crankcase is divided so that it can run at a 25-degree angle without affecting the lubrica-

The propeller is bolted direct to crankshaft so that the crankshaft will not shift or distort itself; the crankshaft is threaded and has an adjustable ball thrust end bearing.

The tests of this motor have been more than satisfactory in results obtained. The motor is wonderfully flexible, and the temperature after two hours' running is all that can be desired for aircraft work.

The speed at one-eighth throttle is 750 R.P.M., and at full throttle, 1,900 R.P.M. The motor shows no vibration at any speed and indicates the even balance of the reciprocating parts. The motor is a guaranteed product and is constructed by the Auto Motor Repair Company, 478 Sterling Place, Brooklyn, N. Y.

The Ford Motor described above which has shown up pretty well in recent tests. This motor has all the original features of the Ford, but is timed and tuned up for the higher speed and extra leed which is called upon to overcome when mounted in an aeroplane





Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a paychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Soiera

Two Tommies, dishevelled, torn with wounds, and alto-gether untidy, were on leave in London. As they stood in Trafalgar Square there approached a detachment of the Royal Life Guards in silver trappings, waving plumes, red coats, long yarnished boots shining like mirrors, and white leather

The Tommies looked on in silence for a moment and then one nudged his mate.

"Looka, Bill," he whispered in an awed voice, "Them's soiers !"-New York Globe.

Modern Curriculum

"Is this a strictly modern school for young women?" "Judge for yourself."

"Well?"

"Dancing, motoring, aviation, and stump-speaking are featured in the curriculum."-Birmingham Age-Herald.

No Argument

After a young lawyer had talked nearly five hours to a jury, who felt like lynching him, his opponent, a grizzled old veteran, arose, looked sweetly at the judge, and said:

"Your honor, I will follow the example of my young friend who has just finished, and submit the case without argument."



Y. Globe depicts the troubles of on

Overheard at an Aerial Passenger Booking Office

The booking agent of a well-known passenger air line sends us a few samples of questions asked by prospective passengers

issengers:
"If I take my dog with me, do you think he will get sick?"
"Must I take Motherill's seasick remedy before I go up?"
"Can I stop off to see a friend on the way down?"
"If I get killed do you have to go to prison?"

- "Are your pilots blonde or brunette? I read an article that only blonde pilots made good overseas."
- "What happens if your engine stalls while we are in the air?"
 - "Will you promise not to fly too high?"

"How often have you been hurt?"

"Supposing I change my mind at the last moment, do I have to pay?"

How to Catch an Aviator

Wilmington, Del., Aug. 20 (Press dispatch)—"I know we'd catch an aviator," laughed Miss May Ruperi, as, with her sisters, Misses Anna and Amy, they greeted Lieut. Charles Potter, Army aviator, as he landed on the hawn in front or their place, Rupert Farm, at Sedgley.

A few minutes later two more fliers landed into the girls' et and the sextet were seated on the lawn having tea when Lieut. Floyd A. Wilson, commander of the squadron, dashed up in a motor car an hour later.

up in a motor car an nour later.
"Where have you been?" queried the worried officer, "When I saw you circling over the city and then disappear I thought you had been killed."
The three culprits looked sheepish and then the girls explained. They had heard of the expected arrival of the air

photographic expedition from Langley Field, near Washingphotographic expedition from Langiey Field, near wasning-ton, and when they were out motoring yesterday and saw Lieut. Wilson, who had come ahead of the others to prepare for their arrival, putting out his landing "T" near Greenville, they conceived the idea of constructing a similar "T" on their own place and catching some aviators.

With bed sheets they fashioned the two arms of the "T" which are used to direct aviators to their landing field, spread the cross on their lawn and awaited results. When Lieut. the cross on their lawn and awaited results. When Lieut. Pottery, flying in advance, espied the mark he alighted to the Rupert farm. The other two men missed both marks and landed at the country club. Later, learning where their companion had landed, they again "took off" and joined him at the farm.

Bring Your Own to Hendon Drome

"Hendon,—The afternoon of Saturday, July 12, was quite as exciting as usual, perhaps more so, as the Summer Meeting was postponed, and only two passenger-carrying carroly "Averos" disturbed the peaceful sight of the trains going by. It had rained quite unpleasantly in the morning, but cleared up quite nicely in the afternoon. It would have been possible to hold the meeting, as rain does not interfere with determined. to hold the meeting, as rain does not intertere with determined variators, but the public would not have been very pleased to sit on the wet forms. It strikes one that perhaps after all content of the properties of the propertie (London).



Propellers of R-34 protected with Valspar-

BEFORE starting the homeward trip inspection of the propellers of the British dirigible R-34 showed that the flight to America had badly in-

jured the varnish, leaving the laminated blades in At Major Scott's direction Valspar Varnish was used to refinish the propellers because he knew that Valspar was absolutely waterproof and elastic enough to stand the terrific vibration without cracking.

a dangerous condition.

The photograph shows the Valentine crew at their difficult task of Valsparring the stern propeller while the giant dirigible swung hundreds of feet back and forth across the field.

Hardly an hour after the varnishing was finished the remarkable drying qualities of Valspar were accidentally proven when tons of water ballast were dumped on the forward propeller, and a few moments later the hot engine exhaust beat against it for ten or fifteen minutes. But already the Valspar had set and no harm was done.

In air service as in marine work you can always depend absolutely on Valspar - it is acci-

dent-proof. VALENTINE & COMPANY

456 Fourth Ave., N. Y. Largest Manufacturers of High-grade Vara

New York Chicago VARNISHES Boston Amsterdam W. P. FULLER & CO., San Francisco and Principal Pacific Coast Cities

done credit to a large factory devoted entirely to the business of building planes. Something of the character of the work done at these depots can be realized when it is stated that it does not consist simply of the minor repair of a broken wing section or a slight defect in engine, but in the majority of cases amounts to the complete overhauling of a motor and the entire rebuilding of the plane.

Routing a Job Through the Shop

To understand adequately the amount of work done on one machine it is necessary to visualize a total wreck as it is unloaded from the railroad car, with hardly a stick of wood or piece of metal nardy a suck of wood or piece or meta-apparently in usable condition, and then see the repaired plane a few days later completely rebuilt and newly varnished, displaying the Red, White and Blue Bull'seye of the Air Service on the wings, and ready to take the air for active service ready to take the air for active service again. Not only have the men of this depot repaired almost hopelessly damaged planes and engines, but they have also completely constructed a plane from the ground up, and turned it out in as perfect condition as an aeroplane from any recognized factory. An excellen-way to obtain an idea of the repair work done by the aeroplane mechanics is to follow a job through the shop. The main shop buildings are the Aeroplane Assembly and the Engine Repair, two long wooden structures adjoining each other wooden structures adjoining each other sufficiently closely for effective co-opera-tion. The lumber shed which feeds the cated near one end of that building, as is also the Dope House, to which the plane goes for varnishing. Right behind the Engine Repair is the Aero Supply Building, where an enormous stock of aeroplane supplies is always kept on hand, so that it takes but a short step to secure so that it takes but a snort step to secure needed materials. The aeroplane werecks are unloaded on the shipping platform of the Aeroplane Assembly Building, where they find themselves almost immediately in the Dismantling Department, located near the receiving entrance of the buildnear the receiving entrance of the building. Here the engine is taken out and
sent ower to the Engine Repair Building,
to go through the various processes of
overhaulting. This overhauling includes,
first, a trip to the washroom, where all
the parts are thoroughly cleaned and the
carbon scraped off: then follows a rigid
inspection to see which parts are to be
rejected. Such parts are replaced by new rejected. Such parts are replaced by new ones, and others susceptible of repair are repaired. Then begins the work of re-assembling. When the engine is again completely set up it is swung by chains onto an overhead rail and pushed out to the motor blocks, where it is subjected to

for installation in the plane.

Let us now follow the fuselage in its Let us now rollow the Iuselage in its journey through the Aeroplane Assembly Building. First, the old fabric is stripped off and the wines, landing gear and tail surfaces removed. Each separate part is tagged with the number of the aeroplane from which it was taken, and sent to its proper department, where it undergoes proper department, where it undergoes close inspection, and, if defective, is re-placed by a new part. The fuselance frame is then set up, carefully examined, and notes made of the repairs needed. Then it moves on a few yards further to the "First Assembly," where the process of renairing begins. Broken longerons are spliced and new straps and fittings put on. In the "Second Assembly" wires and on. In the second assembly were and turn-buckles are replaced, and the gas tank, seat rack and engine bed is added. The fuselage is then put on an aligning stand and is trued up, after which it



A VIEW IN THE FINAL ASSEMBLY ROOM This photograph shows places in all stages of final assembly, from those availing the stallation of the engine to others, further back in the picture, that are ready for shipme in this picture, the are ready for shipme in this picture can be seen the chains of the averhead shap railroad, made by the Richardse Wilcox Mig. Company, Aurora, Ill., and used throughout the shops; for surface transportation as hap truck made by the Automatic Transportation Co. af Buffalo is used

moves on to the "Sub-Assembly," where it receives the instrument board with equipment. The next move finds it in the "Fabric Department," where the covering requipment. The next move finds it in the "Fabric Department," where the covering is put on, after which it is ready for varnishing in the "Dope House." Meanwhile the wheels and landing gear are being repaired or replaced, and when the fuselage has been varnished and lettered it comes out to the "Final Assembly, where it is put on a stand, the engine is "dropped in" and the radiator added. Then the landing gear is affixed, cowl. streamline, center section, empinage and wings follow, and the thing finally stands wings follow, and the thing finally stands forth as an aeroplang all complete. A final test of the motor follows, and then if the whole job is found satisfactory the plane is again taken down for packing and crating; or if its destination is some field within the "flying delivery" radius the plane is hauled over to the Speedway motor course on trucks and trailers. tested in flight, and then flown away.

The Future of the Repair Depots

From all this it will be seen that the aviation repair depots have been a vitally necessary and important link in the great chain of air service institutions. Additional depots had been planned and would doubtless now have been in operation had the war continued longer. What the fate will be of the three depots now existing remains to be determined. If the Southern flying fields, where all-year-round flying can be carried on, are to be maintained in peace times, it would seem logical to retain both the Dallas and Mont-gomery repair depots. In the North, how-ever, the fields are not used in the winter, although some of them could be; and in any case they have been closed since the ending of the war.



A view of the Welding Room of the Small Parts Department, with the Blacksmith Scop in the background

Vol. 9, No. 26

SEPTEMBER 8, 1919

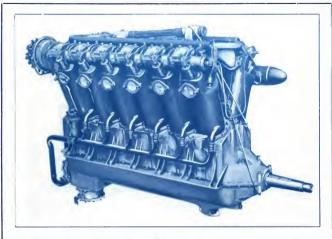
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The Harvard Stadium, and Cambridge Bridge Across the Charles River

The British Aircraft Competition—Why Not an American Competition?

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THE LIBERTY ENGINE & FOUNDRY COMPANY announces to the aircraft industry that plans have been completed for the manufacture of Liberty Motors for commercial purposes. Orders are now being accepted for early delivery

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Vot. IX

SEPTEMBER 8, 1919

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T was once the exceptional surgeon who made his rounds by automobile. What about visiting patients by aeroplane?

Not a bad idea, according to Dr. F. A. Brewster, of Beaver City, Nebraska. Called to Herndon, Kansas, to perform an operation. Dr. Brewster covered fiftyfive miles in fifty minutes, reached his patient, operated, and returned in another hour to his home. He had Curtiss service. His is one of a number of experiences showing how the air road is the road to patient when time-saving is necessity.

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Aircraft Association

& DOUGLAS WARDROP F. McLAUGHLIN, A. M. E. LESLIE V. SPENCER, M.E. B. C. BOULTON EDGAR H. FELD

VOL. IX



HENRY WOODHOUSE SENRY HARRISON SUPLI NORMAN E JENNETT SARAH CROCKER PAGE

NEIL MecCOULL, M. E. H. B. CHILDS

THE NATIONAL TECHNICAL, ENGINEERING AND TRADE AUTHORITY

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NEW YORK, SEPTEMBER 8, 1919 NO. 26

direction

THE BRITISH AIRCRAFT COMPETITION—WHY NOT AN AMERICAN COMPETITION?

HE complete regulations governing the British aircraft competition have been received by AERIAL AGE in an official communication from the British Air Ministry. Official communication from the British Air Ministry. The regulations are of special interest, as they establish a basis for developing regulations for technical competitions dealing with different aspects of aeronautic progress. This progressive step of the British Government opens a way for American Government to do likewise.

The official communication follows: A committee composed of members of the Air Ministry and of the Aviation Industry has been sitting for the past two months under the chairmanship of the Under-Secretary two months under the chairmanship of the Under-Secretary of State for Air to consider the question of encouraging the future development of aviation on the lines of increased safety. A large number of witnesses has been called, including constructors and designers and representatives of public who are interested in aviation. It has been decided, as stated in Parliament, to institute a competition open to the British Empire. Prizes to the value of £64,000 will be awarded by the Government under the conditions which are set out below: Rules for a Competition for Aircraft to Further the Attainment of Safety of Air Travel

(a) The aim of these competitions is to obtain a real advance in the efficiency and design of aeroplanes and sea-planes, more especially with the view of increasing the safety of air travel. The rules drawn up are intended to secure this object.

As regards the rules for aeroplanes, it is recognized (b) that the conditions are, generally speaking, easier for the small machine than for the large. The object in this is to attract a large number of competitors from among designers of small machines.

ot small machines.

(c) The present competitions are not directly aimed at engine reliability, nor at economy in fuel and oil consumption, although these are of the first importance, but chiefly at the attainment of efficiency in the machine itself. A much longer time is required to produce radical improvements in engines than in machines, and since it is intended that the present competitions should be held early next year, it has been decided to concentrate attention on the machine on this occasion.

1. A competition will be held commencing on March 1, 1920, with the object of ascertaining the best types of aero-planes which will be safe to travel in, and in particular be capable of alighting in and rising from a small space.

2. Two types of aeroplanes will be entered for the com-

petition: Small type with a total carrying capacity of 2 persons (a)

(including pilot). (b) Large type with seating accommodation for 15 persons

(exclusive of crew). (exclusive of crew).

3. Machines and engines must have been designed and constructed within the British Empire. This rule will not, however, apply in the case of such secondary equipment as ignition system, carburetors and instruments.

4. Machines are to fulfil all conditions required for a

certificate of airworthiness, and are to carry parachutes for

all persons for whom accommodation is provided, including

 Each machine must be capable of flying level at or above the following speeds with full load at ground level: Small Type Large Type 90 m.p.h. 100 m.p.m.

And must also be capable of flying level at or below the following speeds with full load at ground level: Small Type Large Type

Each machine must also be capable of climbing not less than: Small Type
500 feet in the first minute, Large Type 350 fect in the first minute,

starting from ground level, starting from ground level. Landing and Getting Off Test

(a) A circle will be marked out on open ground to repre-sent a field surrounded by obstacles. This circle will be of the following diameter:

(b) The landing to be made in still air. Still air includes any wind not exceeding 5 miles per hour at ground level.

(c) During landing the machine is not to side slip nor to turn after reaching the obstacles until it is on the ground. Once it has touched the ground the machine may turn in any

(d) The machine to come to a standstill before reaching the marks representing the boundary of the field.

(e) After landing, the machine to get out of the same field over the 50-foot obstacle in still air (as defined in sub.

para. b), no turn to be allowed until clear of the obstacle on the far side.

(f) No braking device operated by the engine may be

used during landing.

(g) Any landing or taking off gear used must be integral with the machine.

with the machine.

(h) No landing apparatus may be used that in the opinion of the judges would be liable to cause undue damages to an aerodrome, e. g., a claw attached to the machine as used on certain types of German machines would not be allowed, but

certain types of teerman macrines would not be allowed.

(j) Both landing and taking off to be with full load.

(k) Each machine will be allowed two trial attempts
(which are definitely not to be counted as tests), and therealter will be allowed four attempts, of which two must be successful.

Reliability Test

). In the case of the formal type 1781 machine must earry on a series of two flights 135, hours each at a speed through the air of not less than 80 miles per hour, starting with full load. Between flights machines will be left untouched, and under seal if necessary, a period of not more than 30 minutes, being allowed before the second flight, for the purpose of filling up and normal examination.

No parts of the machine to be adjusted or changed without

(b) In the case of the large type, each machine must carry out one flight of 7 hours' duration at a speed through the air

out one night or / nours' duration at a speed through the air of not less than 75 miles per hour, starting with full load. Pilots may be changed during these flights.

8. Machines must be capable of landing from a height of 500 feet, with their engines switched off or completely throttled down.

9. In a machine having two or more engines the stoppage r retardation of any one engine must not prevent the machine from flying level, nor cause it to get out of control

Machines must be capable of being started from the cockpit or cabin without undue muscular exertion on the part

of the pilot.

11. Machines to be capable of flying at cruising speed for

11. Machines to be capable of nying at critising special to 5 minutes without the use of any controls or stabilizing devices. Controls may be locked during this test.

12. Machines to be capable of standing musttended and not fastened down in a wind of 10 miles per hour, blowing in any direction with reference to the machine.

The design of the machines to be such that the risk of the machine turning over on a rough ground is reduced to a minimum.

14. Each machine to be provided with a complete outfit for egging it out in the open. This outfit will not be carried as

pegging it out in the open. The part of the load during tests. 15. In order to be eligible for prizes, machines must fulfil the conditions and tests laid down in Rules 3 to 14, inclusive.

Marks will be awarded for soundness and quality of construction, for general features and for exceeding the specified requirements in Rules 5 and 6.

requirements in Kuies 5 and 5 quality of construction" will include:

(a) Fire protection, including use of self-sealing tanks, position of tanks, (from the point of view of safety from fire in event of a crash); fire-fighting appliances and accessibility

of same. (b) Reliability of petrol, oil, and water systems, and facilities for seeing if all tanks are full.

(c) Durability of machine, including propeller (any

advantages due to metal construction may be taken into account).

count).

(d) Simplicity of design and accessibility of parts.

(e) Absence of vibration in the machine.

17. "General features" will include:

(a) Efficiency and ease of control.

Unrestricted field of view to the front for the pilot. Silence, as affecting occupants of the machine, includ-

ing crew. Comfort generally, including warmth.

(e) Self-starting devices.
(f) Method of wind screening adopted.
(g) Convenience for use of instruments.

(h) Freedom of entry and exit for occupants.

8. With reference to Rule 6, marks will be allotted for the capabilities of machines to land in an area more restricted than that used for the tests.

than that used to the tests.

In judging this, the point vertically below the point where the centre line of the machine crosses the tape will be marked on the ground and the maximum distance reached by the wheels of the undercarriage will be measured in a straight

wheels of the undercarriage will be measured in a stranging from this point.

allotted for exceeding the minimum high speed and for flying less than the maximum low speed.

20. The judges will have regard to the method of fitting parachutes and especially to the means of exit by parachute afforded to the occupants of the large machine and will allot

anotect to the same.

21. Marks will be allotted for the convenience of pegging out the machine in the open and for the lightness of the apparatus necessary for pegging down.

22. Marks will not be given on account of the number of

engines installed.

23. The following will be the allotment of marks:

Soundness and quality of construction (Rule 16).

Sub-para.	(a)	Maximum	8			
	(b)	54	8			
44	(c)	ef	6			
88	(4)	44	6			
. "	(e)	**	4	Maximum	total	32
General Feature.	s. ((Rule 17).				
Sub-para.	(a)	Maximum	6			
41	(b)		6			
**	(c)	**	6			
44	(d)	es	5			
46	(e)	64	ŝ			
44	(()		3			
44	10)	44	3			
	(h)	44	2	Maximum	total	36

High Speed. For each m.p.h. in excess of required minimum (Rule 5).... Low Speed, For each m.p.h. below required maximum (Rule 5)... 1/2 No maximum

I No maximum Landing. For every complete 3 yards less than the distance allowed in 175 yards for

small and 275 yards for large machines (Rules 6 and 18)..... No maximum Max. Marks Method of fitting parachutes (Rule 20) Convenience of pegging out (Rule 21)....

Forfeiture of Marks

changing parts in reliability Adjusting or Max Marks test. See Rule 7 (a).

For every two minutes or portion of 2 minutes in excess of the maximum time allowed for filling, 1 mark. See Rule 7 (a)......

24. With reference to Rule 6, when carrying out the landing and getting off test, machines will start with the full load of petrol and oil and will be allowed to fly for 20 minutes. If they have not carried out their tests by the end of that period, they must land and fill up again.

25. The type of propeller used on any machine must be the same for all the tests.

26. Full load is to include: Instruments as under Revolution counter.

Aneroid. Air speed indicator. Turn indicator. Compass. Watch

Oil pressure gauge (when necessary). Air pressure indicator (when necessary). Radiator thermometer (when necessary).

Small Type Petrol and oil sufficient to fly 450 miles at 3,000 feet. In addition, a load of 440 lbs., to include weight of pilot and passenger, if carried, and parachute.

Large Type
to Petrol and oil sufficient to
In fly 600 miles at 3,000 feet. In addition, a load of 3,000 lbs., to include weight of passen-gers, if carried, and also to include parachute, but not to include the weight of crew.

27. Petrol and oil for the tests and as far as possible accommodation (at owner's risk) for the machines will be supplied free by the Government.

supplied free by the too'vernment.

22. The judges shall have freely to disqualify any
22. The judges shall have feetive in any respect.

29. The judges shall have the right to put up a service
pilot to fly any of the machines, should they consider it
desirable to do so, at Government risk.

All tests will, however, be carried out by the entrant's pilot.

30. During or on completion of any flying test, if it is necessary to effect any repairs to the machine after landing, it will be considered to have failed in that particular test. This does not apply to cases where the machine is by the judges' instructions being flown by a pilot other than the

entrant's pilot. Any entrant may enter more than one type of machine.
 If a machine is wrecked during the competition, it may, at the discretion of the judges, be replaced by another.

but the replacement machine must carry out the whole pro-gramme of tests.

33. The decision of the judges shall be final in all matters affecting the competition.

34. The Government does not accept any liability in respect

34. The Government does not accept any landing in respect of accidents during the competition, whether resulting in injury to personnel or damage to the machine, except as specified in Rule 29.

35. The Government reserves the right to adjourn the

competition

The Government reserves the right to withhold any nr

30. The Loveriment reserves the right to winning any mall of the prizes if in the opinion of the judges no real advance on existing designs is shown.
37. The Government will, if the entrant agrees, buy the machine of each type winning the first prize, the designs to remain the property of the manufacturers. The maximum machine of each type winning the first prize remain the property of the manufacturers. prices payable under this head will be:

Smo?! Type
44,000

L

Large Type 38. The tollowing prizes are offered: Small Type 1st prize £10,000 Large Type £20,000 2nd prize 4.000 3rd prize 2,000 8,000 4,000 39. Entries to close December 31st.

Seaplanes

1. A competition will be held on March 1, 1920, with the object of ascertaining the best types of Float Seaplanes or Boat Seaplanes in which it will be safe to travel, and in par-ticular to be capable of alighting on and arising from land

as well as water.

2. Each machine entered for the competition will be provided with seating accommodation for four persons, exclusive of the crew.

3. Machines and engines must have been designed and constructed within the British Empire. This rule will not apply in the case of such secondary equipment as ignition system carburetors and instruments.

4. Machines to fulfil all conditions required for a certifi-4. Machines to fund all conditions required for a certificate of airworthiness, and to carry parachutes and lifebels for all persons for whom accommodation is provided including the crew. The boat or floats must be so sub-divided that if perforated in any one part each float still remains positive. buoyancy

 Each machine must be capable of flying level at or above a speed of 80 knots with full load at sea level, and must also be capable of flying level at or below a speed of 40 knots with full load at sea level.

40 knoss with full load at sea level.

Machines must be capable of climbing not less than 350 feet per minute in the first minute.

6. Allishing and Getting Off Tests. (a) Getting off test (sea). Machines will be required to take off with full load and clear an obstacle 25 feet above sea level in a distance not exceeding 300 yards from a position of rest. (b) Allighting test (land.) Machines will be seen to exceed the season of the yards, measured in a straight line from the point where the obstacle is crossed. For this test machines will be required obstacle is crossed. For this test machines will be required to carry full load less 50% total and oil.

(c) Getting off test (land). Machines will be required

to take off a smooth aerodrome with full load and clear an obstacle 25 feet in height in a distance not exceeding 400

yards from a position of rest.

(d) The above tests are to be made in still air which for

(d) The above tests are to be made in still air which for the purposes of this competition will be regarded as any wind velocity not exceeding five statue miles per hour.
(e) During landing the machine is not to side-slip nor to turn after reaching the obstacle until it is on the ground. Once it has touched the ground the machine may turn in any

direction (f) No braking device operated by the engine may be

used during landing.

(g) Any landing or taking off gear used must be integral (g)

with the machine.

(h) No landing apparatus may be used that in the opinion of the Judges would be liable to cause undue damage to an aerodrome.

aerodrome.

(i) In test (a), (b) and (c) above, machines will be allowed four attempts, of which two must be successful. 7. Test of Retibility is Flight. (a) Each machine the action of the state of the size of not test shan 70 knots, starting with full load the air of not test shan 70 knots, starting with full load the size of t of emergency

At the conclusion of the 24 hours period the crew will be At the conclusion of the 24 nours period the crew will be allowed on board the machine, will be got under way by its own crew and under its own power and will be required to carry out a short flying test within a period of one hour from the conclusion of the 24 hours period. The test will be carried out under fair weather conditions. Marks will be allotted for rapidity in getting under way. Moderate weather. Each machine will be moored to a

buoy for a period of not less than 12 hours, unattended under

buoy for a person of the following conditions:

Locality—Roadstead sheltered from the open sea.

Wind—From 4 to 6 on the Beaufort Scale.

Marks will be allotted for the general condition of the machine at the conclusion of this test, and its behavior dur-

ing the test.

In both the above tests the ordinary average tidal currents existing round the coast of the British Isles may be experienced

P. Rough water getting off and alighting test.

Each machine will be required to carry out a test of getting each machine will be required to carry out a test of getting off and alighting on disturbed water, which in the opinion of the judges constitutes a moderate sea. The condition in any case will not exceed State 4 in the sea disturbance scale, (Waves under 4 feet in height). Machines will be required to carry out a test of being

10. Machines will be required to carry out a test ot peeing towed in a moderate sea as defined in paragraph (9) in a consistency of the construction of the constru

12. Each machine must be capable of moving on the water, under its own power, for a period of at least 30 minutes and at a speed of not less than 10 knots, and not greater than 20 knots.

13. Each machine will be required to carry an anchor and sea anchor, as well as its own mooring tackle and to anchor on good holding ground with its own gear and remain tast in a wind of 10 m.p.h. and with tidal current not exceed-

ing 3 knots.

14. In a machine having two or more engines, the stop-page or retardation of one engine must not cause the ma-

chine to get out of control,

15. Machines must be capable of flying at cruising speeds

15. Machines must be capane of riging at cruising specials for three minutes without the use of any control or stabilizing devices. Controls may be locked during the test.
16. Machines in the round flying position must take up and maintain a gliding angle, when the engine or engines are cut off without the use of any controls or stabilizing devices.

After stalling, (1) machines must be capable of recovering flying speed and complete control without a loss of more than 500 feet of height.

18. Machines must be capable of being started from the

18. Machines must be capable of being started from the cockpit or cabin without under muscular execution.
19. (1) In order to be eligible for prizes, machines must fulfill the conditions and carry out the tests laid down in paragraphs 2 to 18 inclusive. Marks will be awarded for soundness and quality of construction, for general features, for general behaviour afloat, and for exceeding the specified requirements in Rules 5 and 8 (a).

20. (2) Soundness and quality of construction will include:

(a) Fire protection, including use of self-sealing tanks. (a) Fire protection, including use of self-sealing tanks, position of tanks (from the point of view of safety from fire in event of a crash), fire-fighting appliances and accessibility

of same.

(b) Reliability of petrol, oil and water systems, and facilities for seeing if all tanks are full.

(c) Durability of petrol, oil unduding propeller (any advantages due to metal construction may be taken into account).

(e) Simplicity of design and accessibility of parts.

(f) Absence of vibration in the machine.

(g) Ease of repair, especially in regard to the hull or floats. 21, (3) General features will include:

(a) General reatures will include:
(a) Efficiency and ease of control.
(b) Unrestricted field of view to the point for the pilot.
(c) Silence as affecting occupants of the machine.
(d) Comfort generally including warmth.

(e) Self starting devices.

(f) Convenience of mooring and anchoring arrangements.
(g) Method of wind screen adopted.
(h) Convenience for use of instruments.

(i) Freedom of entering and exit for occupants.
(j) Bige pump arrangements.
22. Behaviour after with 1-2.

Behaviour afloat will include: Stability at rest. (b) Water stability at all speeds.

(b) Water statisticy at an species.

2 Manual spray and forest specific and procedured and flying less than the maximum low speed.

24. The judges will have regard to the method of fitting parachutes and especially to the means of exit by parachute afforded to the occupants and will allot marks for the same. 25. Marks will not be given on account of the number of engines installed.

The following will be the allotment of marks:





THE NEWS OF THE WEEK



Seaplane Tours Planned

Atlantic City.—Extensive scaplane cruises along the Atlantic coast, to take place this fall and winter, were announced recently by Captain Charles J. Gildden, chairman of the Committee on Aerial Tours of the Aerial League of America, who is investigating the facilities for the Atlantic coast. Captain Gildden is the donor of the Gildden Aeroplane Efficiency Trophy.

Among the seplane cruites announced by Capaina (Idden will be cruites from Atlantic City to Balimore, Washington and Norfolk and from Atlantic City to Floring and Iron Atlantic City to Floring and the Galf. Other cruises will will follow the Maissistopia and other great American rivers. Seaplane cruises from Atlantic City to New York and up the Hudson will be among the first to be organized. Capaina (Gidden also amounced Capained Coast will be organized that the Capained Capa

To discuss these plans a conference was held at the Curtiss Flying Station in Atlantic City recently, at which were present Captain Charles J. Glidden, Mr. Henry Woodhouse, vice-president of the Aerial League of America; Mr. Albert T. Bell, president of the Atlantic City Aero Club; Mr. Earle L. Ovington, president of the Curtiss Flying Station, and Mr. A. S. Abell, 3d.

Army and Navy Balloonists to Compete for Championship Cup

St. Louis, Mo.—The Army and Navy balloon pilots will compete for a silver trophy to be awarded to the military balloon champions of the United States. The race takes place at St. Louis on September 26 under the auspices of the Missouri Aeronautical Reserve, the donors of the 833½; cup. Each side will be represented by 836½; three balloons and three teams, the personnel of which is to be announced in 898½;

the near future.

Major A. B. Lambert is in charge of the preparations for the race. Elaborate plans are being made at the camp of the Missouri Aeronautical Reserve. The large number of free balloon pilots which were trained for the dirigible and balloon services of the Army and Navy makes the race of great interest to the men of both the men of bo

Maynard Wins New York-Toronto Race New York, N. Y.—Lieutenant B. W. Maynard, U. S. A., flying a De Haviland Four with a Liberty motor, made the fastest time for the round trip between New York and Toronto in the New York-

fastest time for the round trip between New York and Toronto in the New York-Toronto Aerial Derby 'last week. The official results show that his flying time was 465½ minutes, an average of more than two miles a minute for JoP2 miles. Under a ruling of General Menoher, Lieutenant Maynard is not eligible to the cash prizes offered by Hotel Commodore. These total \$10,000.

There were fifty-two entries for the

flight and twenty-eight finished the round trip. Three made second starts after failing in first efforts. Excellent flying time, as shown by the summary, were made by many of the contestants despite the poor weather conditions encountered.

time, as shown by the summary, were made by many of the contestants despite made by many of the contestants despite for the following is the order of finish and the flying time of the contestants in the New York-Toronto Air Race; Lieut. B. W. Manyard, DH-4, 4954;; Lieut. H. H. George, DH-5, 1844; Lieut. H. H. George, DH-4, 594; Lieut. B. Dimb, DH-4, 594; Lieut. B. Dimb, DH-4, 594; Lieut. P. H. Logan, Le Pere, 562; Lieut. B. P. Homb, DH-4, 594; Lieut. P. H. Logan, Le Pere, 562; Lieut. B. P. H. Logan, Le Pere, 562; Lieut. B. P. H. Lieut. Ben Adams, DH-4, 564; Lieut. John P. Roullot, DH-4, 5794; Major R. Schombo, DH-9, 570; Col. H. E. Hartney, SE-5A, 8894; Lieut. R. T. Midkiff, DH-4, 6024; Lieut. C. F. Brown, DH-4, 6074; Lieut. Charles Colh. SE-5, 820; Land Rholfs, Oriole, 6074; Captain C. W. Cook, Fokker, 7994; Major A. B. Gilkeson, DH-4, 7644; C. S. Jones, JN-4D,

8334; Lieut. W. R. Taylor, JN-4H, 8269; Captain H. B. Chandler, JN-4H, 8954; Captain R. H. Depew, JN-4H-8, 9124; Lieut. L. W. Bertrand, Can. Trng. 12834; Lieut. L. W. Bertrand, Can. Trng. 12834; Lieut. Wallace Young, JN-4H, J3134; Col. Wm. C. Barker, Fokker, 4344; Lieut. C. A. Schiller, Can. JN-4, 15204; Major J. W. Simons, DH-4, 15204; Major J. W. Simons, DH-4,

Rochester-New York Flight in Less Than Two Hours Hempstead, N. Y.—It is announced that the five DeHaviland aeroplanes which

constitute the Dallas-Boston squadron flew from Rochester to New York, a distance of 285 miles, in 110 minutes, an average of 156 miles an hour.

Aerial Landing Field at Sunnyside, Washington

Spokane, Wash.—Commercial flying at Sunnyside, Wash., is to be inaugurated by Lieutenant Parshall. A suitable flying field is being premared.

field is being prepared.
Lieutenant Parshall will also fly to Lewiston, Idaho, to give exhibitions at the local fair. At Yakima recently Parshall carried the youngest passenger on the coast, Miss Ruth O'Keefe, aged 21 months.

Foreign Trade Convention Urges Establishment of Aerodromes

Chicago, Ill.—At the Sixth National Foreign Trade Convention, recently held at Chicago, a resolution was adopted recorded to the record of the record of the record of the resolution follows:

"The Convention suggests to local "The Convention suggests to local"

The Convention suggests do local Chile Convention Suggests and submitted Chile Chile



The Le Pere biplane, equipped with super-charger, in which Major R. W. Schroeder made the high attitude speed record of 137 miles an hour at 18,400 feet

1169

Low Parachute Jump from Seaplane New York, N. Y.—Major Orde Lees, late of the Royal Air Force, took a leap late of the Royal Air Force, took a leap from a low-flying seaplane on August 28 near the Statue of Liberty to demon-strate the reliability of the "Guardian Angel" parachute for short drops.

Angel" parachute for short drops.

The experiment was being undertaken to secure scientific data and photographs of the exact manner in which the parachute performs when dropped with a fast moving aeroplane. It chute performs when dropped with a man from a fast moving aeroplane. It is hoped that the result will show that an aviator escaping from his burning or crippled machine need have no fear of being drowned or of being enveloped in his parachute should he happen to fall in water.

the water.

The aeroplane from which the jump was made is a three-passenger Curtiss flying-boat, piloted by Lieut. McCullosh, who piloted the NC-3 in the trans-Atlantic flight. Major Lees holds the low altitude record, made when he dropped from London Bridge, a height of 153 from London Bridge, a height of

American Escadrille in Polish Army to Fight Bolsheviki

Fight Bolsheviki
Paris.—An American aviation squadron is being formed in Paris on the lines
of the Lafayette Escadrille to fight with
the Poles against the Bolsheviki. Major
M. C. Fauntleroy, of Chicago, and Capt.
M. C. Cooper, of Jacksonville, Fla., have
received authority from Gen. Rosvedowski, head of the Polish Military Mission,
which was the property of the Polish progress who like to form a squadron of aviators who, like themselves, have seen service in war avia-

Among the men already enrolled are Lieut. Edward J. Corsi, of Brooklyn; Lieut. Gorge M. Crawford, of Wilmington, Del.; Lieut. Kenneth Shrewsbury, of Huntington, W. Va., and Lieut. Carl H. Clark. of Tulsa, Okla. Steudron will be designated the Konsulton will be designated the Konsulton. usko Squadron, after the Polish national hero and Washington's aide-de-camp.

This American squadron is expected to go to Poland September 15. Its memto go to Poland September 15. Its mem-bers will hold the rank they held in the American Army, but the corresponding Polish pay being less, the men are mak-ing a sacrifice. No term of service is fixed, but the aviators will not be called upon to serve more than a year.

Curtiss Company Plans New Air Routes Burfalo, N. Y.—The Curtiss Aeroplane and Motor Corporation is to establish several new air passenger routes. The planes will be manned by aviators who served in the war and will be specially suited to passenger traffic.

suited to passenger trame.

The cities on the routes are to be Rochester, Syracuse, Utica, Albany and New York on one, Erie and Pittsburgh on another, and Hamilton and Toronto on a another, and riamitton and Toronto on a Canadian route. The route across New York State probably will be opened this fall and the Pennsylvania and Canadian routes next spring.

Planes Fly in Formation under New York's Bridges

Mineola, L. I.—Attempting a new feat, three aviators flew under the five suspension bridges over the East River. The pension brugges over the East work. The planes flew in triangular formation, starting from Hazelhurst Field at 1:30 P. M., and returning at 2:35 P. M., on August 28.

Lieutenant A. S. Roberts headed the three planes, with Lieutenant C. H. Bur-gess, who was recently the bridegroom in an aeroplane wedding at Sheepshead Bay, on his right, and Lieutenant N. L. Elliott on his left.



W. G. Ranels who is representing the interests of the British & Colonial Aeraplane Co., manu-

British Air Attaché Seeks R.A.F. Officers Who Have Not Received Their

Washington, D. C.—The British Air ttache, Air Commodore L. E. O. Attaché, Air Commodore L. E. O. Charlton, D.S.O., has issued a notice for the attention of all Royal Air Force officers and other ranks, now resident in the United States or its overseas possessions, who have been awarded the Distinguished who have been awarded the Distinguished Flying Cross or the Air Force Cross, and who are not yet in possession of the same, should communicate, without de-lay, to him at the British Embassy, Washington, D. C., in order that arrangements may be made for the due presentation the decorations.

of the decorations.

The above also applies to officers late of the Aviation Service (Army or Navy) of the United States, who are similarly entitled, but who are demobilized, there-

fore not necessarily in communication with the authorities in this matter.

Around U. S. Flight Resumed Washington, D. C.—The War Department authorizes publication of the following statement from the Director of the

Air Service:
"After a delay at Plattsburg, N. Y., due to necessary repairs, Colonel R. S. Hartz, of the Army Air Service, has again taken the air in a Martin Bomber on his trip around the United States. With Lieutenants E. E. Harmon and L. A. Smith, and a mechanic, he flew from Plattsburg to Buffalo on August 30, a distance of 326 miles, in five hours, with one stop for gas, He expects to leave this morning, August 31, for Cleveland.

Four Year Old Avistrix Demands Loops New York, N. Y.—Miss Virginia Marie Wallel, Ioni-year-old daughter of Mrs. John J. Wallel, of Brooklyn, N. Y., not John J. Wallel, of Brooklyn, N. Y., not manding loops and other suits on her flights. She is a regular passenger at Dana C. De Harr's Aerodrome, Hillside Avenue, Queens. Recently she took a 23-mile flight at an altitude of 2,100 feet. Her mother accompanied her and Dana C. De Hart piloted the plane.

Fast Flight from Buffalo to New York J. D. Hill, a plot aviator, of Buffalo arrived at Mincola, L. I., on August 22 in a Curtiss Oriole machine, after flying from Buffalo, a distance of 440 miles, in four hours and ten minutes. The time established a record for this trip.

1,000 Miles of Aerial Honeymoon Completed

Spokane, Wahn-Frinking the first 1,000 miles of a 5,000 mile honeymoon tour, Lieutenant Floyd Kelso and bride, of Kennewick, Wash, arrived in Spokane, the last lap being from Coulee City, Wash, which was covered at a mileamore flight. The bride of a week is minore flight. The bride of a week is minore flight. The bride of a week is well as the second of the second weather drives them to terra firma



Lieutenant Floyd Kelso and his bride landing at Spokane, Wash., after completing 1,000 miles of their 5,000 mile serial honeymoon



. Bishop Heads Interallied Aircraft Corporation

York, N. Y .- The Interallied Aircraft Corporation recently received its incorporation papers under the laws of the State of New York, to sell and manufacture foreign and domestic aero-

manufacture foreign and domestic aero-planes, seaplanes, motors and accessories. It is already in a position to deliver tenny-five currist training, in excellent condition and with full equipment.

W. A. Bishop, the Canadian Reed G. Landis, second ranking American acc, and W. G. Barker, R.A.P., vice-presi-dents; J. W. M. Richardson, treasurer; W. R. Lott, secretary: Chas. H. Payne and C. S. Macdonald, general and as-sistant managers, respectively. Offices have been established at 185 Madison Avenues, New York.

William G. Ranels Represents Bristol Here

New York, N. Y.—Mr. William G. Ranels has recently opened an office at 512 Fifth Avenue, and represents in the United States the interests of the British & Colonial Aeroplane Co., Ltd., Bristol, England.

Mr. Ranels was sent abroad by the War Department early in June, 1917, in connection with aviation matters and durconnection with aviation matters and during two years was located in London as an Aviation Technical Representative of the U. S. Air Service.

The British & Colonial Aeroplane Co., td., was established February, 1910, at a time when the importance of the future

open to aircraft was scarcely realized. Remarkable progress has been made since the foundation of the company and it now maintains an enviable position in the in-

The directors of the company have se-cured the services of the highest authori-

ties in theory and best practical expo-nents of aviation, the sole object being to produce the most reliable types of machines and to organize methods by which every improvement and research develop-ment could be immediately embodied. Within twelve months of the formation

of the company, "Bristol" aeroplanes were

of the company, "Bristol" aeroplanes were flying in England, India, Australia, South Africa, Italy, Russia, Roumania and Spain—the remarkable record in the progress of the new industry. At the beginning of the war approxi-mately 80 per cent of the British service pilots had been trained at the "Bristol" schools from date of establishment, March, 1910.

At the opening of the war several types "Bristol" machines were utilized by or Bristol machines were utilized by the government. During the period of the war many successful types of ma-chines were developed, practically all of which were adopted by the British Gov-ernment and put into production for service.

Consistent with the policy of the com-pany, now that hostilities have ceased, plans have been prepared for the rapid development of types of machines suitable for commercial and sporting purposes. The work of developing planes suitable for military purposes will also be continued.

Capt. F. S. Barnwell, chief designer, who has been with the company for a who has been with the company for a number of years, will continue on the lines of progressive design. The unlim-ited facilities for manufacture of all types of aeroplanes will be fully maintained to meet the demand for machines for pleasure, commercial and defense purposes.

Spokane Aviation Companies in Merger

Spokane, Wash.—A merger of local aviation interests has taken place, and the Northwest Aircraft Corporation

emerges as the successor to the North-west Aircraft Company and the Western Aircraft Corporation. Foster Russell, consulting engineer and aviator, will be the manager of the consolidated concern. Thomas W. Symons, Jr., late of the army, will also be identified with the concern. He is an instructor.

Mr. Symons, who will be in charge of all flying, is reputed one of the most skilled pilots in the northwest. His exskilled pilots in the northwest. His ex-perience includes training at the flying instructors' school at Brooks field and seven months as flying instructor at Call field and Souther field. At Soxther field Symons, after being instructor in all stages of flying, including acrobatics, was made flight commander and late officer in

made flight commander and late other in charge of flying.
Foster Russell had experience at eight different fields, was picked for a pursuit pilot and is experienced in the flying of the fast Thomas Morse scout planes which were equipped with Gnome rotary motors. He now holds a commission as lieutenant in the air service reserve on flying status.

B. L. D. Company to Manufacture Small Aeroplanes

The B. L. D. Aeroplane Company, Inc., whose flying field is located at Spring-field, L. I., on the Merrick Road, are very active carrying passengers every fair day. The field is located within New York City limits and is about ten minutes from Iamaica

Two machines equipped with Hall-Scott motors are in constant use. William Diehl, a civilian army instructor and an old pilot, and Howard W. French, who is one of the first 100 R. M. A.'s with 1,000

flying hours' experience, are the pilots. Mr. R. Brodell has been active in aeronautical circles for some time and is now working on the designs of light aero-planes to be manufactured in quantities.



The Morane biplane equipped with French Bugatti engine



Poor Weather Conditions On New York-Bellefonte Lap

Washington, D. C.—Flying across the mountains from New York to Bellefonte, Pa., has proven to be the most difficult route of the Air Mail Service. This is in part due to the fact that the valleys and cities are blotted out by the early morning ground fogs, leaving only the tops of the ridges exposed as landmarks to aviators. It is also due in part to the changeable velocity and direction of the winds over the 215 miles trip from Belmont Field on Long Island to Bellefonte in the heart of the mountains, due to the variety of topographical changes in the way of valleys and mountains. Also the greatest wind velocities are found during the summer time in that region. This is shown in

mer time in that region. This is shown in the variations of speed of the fast planes of the Air Mail Service. Were made at Out of 101 trips, Were made at Out of 102 trips, Were made at speeds between 81 and 100 miles per hour. There were only four trips in a period of nearly two months in which the wind was strong enough to hold the speed down to less than 60 miles an hour.

The following is an analysis according

to speed	or me	101 1	uns.				
			Stevens	Lewis	Anglin	Logg	Tetal
Between	50 and	60m.t	h 2	2	0	0	4
44	61 and		4	0	3	2	5
40	71 and		4	4	Ö	2	10
90	81 and			5	9	6	21
49	91 and	100	2	8	3	5	18
44	101 and		5	5	7	5 3	20
60	111 and		4 4	5	ò	3	9
44	121 and		6	0	ī	3	10
			_	_	_	_	-
Totals			28	26	23	24	
Grand	total						101

Detroit Selects Landing Field

Detroit, Mich.—After an exhaustive study of available sites, the City Planning and Improvement Commission, of which and Improvement Commission, of which T. Glenn Phillips is director, has recom-mended the development of a 320-acre plat on Plymouth road, eight miles out of the city, as an aviation field. Several months ago the City Plan and

Improvement Commission was instructed by the Council to select prospective sites for a permanent municipal field after Morrow Field was excluded from the possibilities. The commission has several sites under consideration but has chosen the Plymouth road tract as the most desirable and practical for Detroit's use

Following the decision that this field was most adapted to the city's needs, committee of aviators was invited to in-spect the field by the commission. The party consisted of Mr. Phillips, Col. Sidney D. Waldon, Street Railway Commissioner and formerly a member of the United States Aviation Board at Washington; Col. Vincent of the Packard Motor Car Co., who is developing a 100-acre tract for the company as an aviation field; Mason Rumney, William E. Metzger, former president of the Detroit Au-tomobile Club, and Lieut. H. D. Copland, former army aviator, and other aviation enthusiasts

The tract measures one and one-half by one-half miles and lies in an east-andwest direction, and this direction is best adapted to local conditions where west winds prevail.

The new Pennsylvania Railroad route crosses one end of the tract and the Pere Marquette another, making convenient delivery of provisions, equipment, gasoline and other aeroplane necessities a point in its favor. Except for a gradual slope eastward, the field is comparatively

The site can be purchased by the city at a condemnation price of \$200,000.

American Express Company's London-Paris Aerial Express and Pas-senger Service

London.—The American Express Com-pany virtually has completed arrange-ments through its tourist department for ments through its tourist department for daily air passenger and baggage service between London and Paris, according to a cable dispatch received by the New York Sun, "Our plan," said William Gourlay, the company's manager for the United Kingdom, "is to have facilities available whereby a man or woman can leave London in the morning, fly to Paris and tertakes besines there, and returns and tenders. to London in time for dinner, and vice The arrangements are in the final

stages now with the British and French Governments. We expect that customs officials will be posted at each end of the aeroplane route for the specific purpose of checking the baggage of arriving tourists.

"The ship will be installed and oper-ating during October. There will be two grades of travel, both first class, one grands of travel, both first class, one in an aeroplane carrying one or two passengers and costing approximately \$100 for a flight one way and the other in a large air bus carrying fifteen passengers, for which the fare will be about \$60 a person.

"We shall start with the air bus leaving three times a week and the aeroplanes daily.

"Automobiles will convey passengers from their hotels to and from the aerofrom their hotels to and from the aero-dromes, losated respectively on the out-ofference of the control of the con-trol of the control of the control of the singer assume the risk for the journey, a night price of baggs and the control larger than a suitcase. Those going by arrives can travel in their ordinary civil-iant clothes, while passengers for the with headmasks and goggles, supplied with headmasks and goggles.

"The minimum time for the journey will be three hours, while four hours will be the maximum period in the air. The present time by train and boat between London and Paris is nine hours and costs about \$20."

Mr. Gourlay was asked if other air routes had been blocked out for regular passenger services. He replied: "Yes, before the year is out we shall have aeroplanes meeting all arriving passenger ships at Liverpool and Southampton.



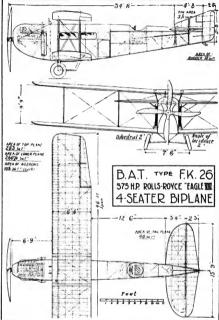
Aerial Mail being landed at Woodland Hills Aviation Field, Cleveland, Ohio

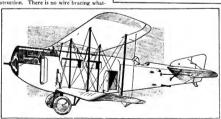
THE B. A. T. FOUR-SEATER BIPLANE

O NE of the first, jit not the first, post-War "commercial" acropiance has just been completed by the British Aerial Transport Co, Ltd., at their works at Wiltesden. By post-War commercial science the Armistics, specially for commercial work—either passenger, mail or goods—and not a war machine converted for this purpose. In this particular case, may be a supposed to the form of the purpose of the property of

lutely straightforward worse, "cranky" features,
F.K. 26 is a single-engine tractor biplane, and as may be seen from the accompanying scale drawings, the general lay-out of the "weight items" is efficient and well thought out. The position of the pilot, well aft in the main planes, is such that it enables him to have an excellent view in all directions.

length, is of rectangular section, very deep near the wings and tapering to a vertical knills—edge at the rear. Two different forms of construction are employed expensed to the rectangular section, very deep near the wings and tapering to a vertical knills—edge at the rear. Two different forms of construction are employed to the possibility of the rectangular to the possibility of the rectangular to the total time in the form as similar manner to that obtaining in the German Albatross machines, whilst the German Albatross machines, whilst the German Albatross machines, whilst the construction. Both systems, however, have many interesting features. There are four main longerons, of about 1½ by 1½ in. L-section (solid where necessary), 12½ in. L-section (solid where necessary) total longeron of similar section in the front half situated between the upper and lower longerons on each side, level with the line of thrust. These longerons are formers in the front half of the fuseling. The possibility purposes the possibility purposes the possibility purposes the sections. In all there are five transverse formers in the front half of the fuseling to the section strust between each diagonal H-section strust between each construction. There is no wire bearing what-struction. There is no wire bearing what-





Three-quarter front view of the B. A. T. 4-seater biplane

ever in this portion of the fuseslage. The first and second formers carry the strong ash engine bearers, the third and fourth are placed in line with the from and rear wing spars respectively—the fourth former being in the centre of the passenger's cabin is, therefore, left open, i.e., it has no too. The fifth former serves as the end wall of the cabin, and between this and the fourth former serves as the end wall of the cabin, and between this and the fourth former is what might be termed a false former of light construction. The engine and fuel compartments was a since the cabin portion has a double (inner and outer) covering. Three separate compartments or bulkheads are thus formed, the first being the "engine room," the second housing the large fuel tanks (six hours), and the third the passenger's cabin.

The latter is exceptionally roomy, measuring roughly 3 ft. in width, 8 ft. in

length, and just over 5 ft. in height. For passenger work, therefore, it affords great possibilities in the way of a luxuriously many and the possibilities in the way of a luxuriously many and the passent model there will be three armethars and one folding seat, the lutter, being opposite the door, which is at the control of the passent will be a few and the passent with the passent pass

The cabin is equally suitable for mail work, and one can easily visualize this roomy compartment fitted up with pigeon-holes and benches, with a P.O. clerk busy at work sorting out letters, depositing them in their respective parachute bags, and dropping them overboard above their destination!

and to discuss the cabin the fuselage is a girder of six bays, the first set of eross members being built up on the lines of the formers in the front half, as shown by No. 6 in the accompanying diagram. Hesceiton, reinforced here and there by three-ply. With the exception of the last one, all the bays are braced with flat "streamline" steel cable; the last bay, lowever, has I-section disconda struct control are located in the second bay, being supported fairly high up in the fuselage by two channel-section hearers on a three-ply floor. This rear portion on a three-ply floor. This rear portion or a tree-ply floor. This rear portion was a steel tube passes across the fuselage through the lower ends of the third bay a steel tube passes across the fuselage through the lower ends of the vertical struts and projects a few inches on either means for lifting the tail.

The control is similar to the well-knows "Dep" type, and consists of a wooden bridge pivoted to the previously menioned bearers, carrying at its upper end the peculiar shaped "wheel" shown in out of the accompanying sketches. The elsewheel the peculiar shaped "wheel" shown in out of the accompanying sketches. The elsewheel the peculiar shaped "wheel" shown in other teach state the peculiar shaped "wheel" shown in other bridge and connected at the rear to a strong single creak arm on the underside of each elevator flag. The aileron cables as strong single creak arm on the underside down the arms of the bridge to its base, whence they pass down to pulleys at the end of the eabin, justs below the floor, under which they proceed to pulleys at a point just behind the front spars, where only the property of t



Some constructional details of the B. A. T. four-seater biplane. On the left is the top plane attachment to the center section which is similar to those on the lower plane. In the center is a sketch of the steerable tail skid, and on the right is the strong but simple elevator crank





Above—The Water Radiator. Below—Radiator, filter, and fuel cap on the B. A.
T. four seater biplane

sruts. For here they pass out underneath the plane to cranks on the underside of the ailerons. The upper and lower alterons are connected by steel cables, and connected by a balance cable passing along inside the top plane. The rudder is operated direct by cables from a wooden inside the top plane. The rudder is operated direct by cables from a wooden control of the plane of the

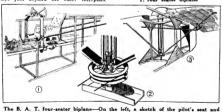
The angle of incidence of the tail plane can be adjusted whilst in flight b, near of an aluminium wheel, at the plots left just below the seat, which operates through cables a screw and nut gear as shown in one of the accompanying sketches. The rear spar of the tail plan is hinged, so that the front of the tail is not apply to the cable of t

raised or lowered. raised or lowered.

The main planes are of equal span, and are made of four interchangeable sections and a centre section to which the upper planes are attached. The centre upper planes are attached. The centre section is mounted on two pairs of steel struts sloping outwards from formers three and four. Each pair of struts is laterally cross-braced by flat, oval section steel wires. A steel strip also connects the lower ends of the port and starboard struts and takes some of the load from the landing wires, which are taken from the base of the centre section struts to the lower plane. The lower plane is attaehed to short centre sections projecting from the sides of the fuselage, giving the same overall width as the top centre section. The centre section spars pass with the respective former. In the front one the ends are cut short for the passage of the chassis strut, which passes through a welded steel box which replaces the cut-away portion of the spar. The end of this box also forms the wing attachchent fitting which is the same on all spars, and which is shown in one of the illustrations. Constructionally, the planes present nothing unusual, except perhaps in the tips. They have what might be described as a lateral washout, that is, the under surface curves up to meet the top surface which is level right to the tip.
The spars of laminated I-section, solid where necessary, and the ribs are built up as usual of spruce webs and flanges. Each wing has four bays, the compression members being of the box type, and located at the interplane struts with a third in

between. The internal bracing is of piano

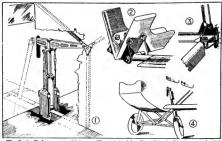
wire, the outer bay having a diagonal strut. Top and bottom planes are sepa-



The B. A. T. four-seater biplane—On the left, a sketch of the pilot's seat and control. On the right, the tail plane trimming gear, and inset, a detail of the screw gear of the latter

rated by two pairs of tubular steel struts aside, and the whole of the external bracing is by streamline wire. Ailerons are fitted to both top and bottom planes, and these taper from root to tip.

The tail plane is of high aspect ratio, and has a symmetrical streamline section. It is built in one piece and mounted just above the top longerons. The rudder is above the top longerons. The rudder is balanced, the vertical fin being cut away By far to receive the balanced portion. and away the most interesting feature of the F.K. 26 is the landing chassis and its shock-absorbing arrangement. As may be seen from our illustrations, the wheels are each hinged by two stub axles to a cabane, consisting of a pair of V struts connected by a longitudinal member, mounted on the bottom of the fuselage. The front pair of these stub axles lies at The front pair of these stup axies hes at right angles to longitudinal axis of the machine, and the other pair is inclined back to the rear V of the cabane. Ex-tending upwards from each outer extrem-ity of these "axle-Vee" is a steel tube ity of which is connected at its upper extremity to the end of a lever projecting through the sides of the fuselage and hinged at its other end to the centre of the fuselage-former. Near the outer extremity of this lever is a lug from which connection is made to an oleo shock-absorber and to a pair of ordinary elastic shock-absorbers. There is a similar gear on each side of There is a similar gear on each side of the fuselage. Thus, on landing, as the wheels rise, they also lift the levers against the action, first, of the oleo, and then of the elastic absorbers. The levers above referred to are of welded steel box construction, and it will be noticed that the wheels are splayed, so that when in flight they point inwards in a down direction, and when on the point of landing they are more or less horizontal, and when the machine is at rest, with its full weight on the wheels, they point inwards in an



The B. A. T. four-seater biplane.—The original landing chassis showing on the left the shock-absorbing gear, and on the right the hinged stub azles and hub at the top, and below, a general view of the chassis

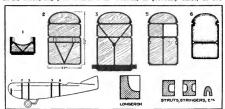
up direction. The general arrangement and construction of this landing gear is clearly shown in our illustrations.

Another interesting feature is in the tail skid. This is of the sterable type, and consists of a short steel-shod wooden skid anchored at its upper end to a tube passing up through, and secured to, the connected to a lug some distance up the rudder post by two telescopic tubes passing up through the rudder, and containing a steel spring, which absorbs the shocks on striking the ground.

The engine is a Rolls-Royce Eagle, VIII, mounted, as previously stated, on two strong ash bearers between the first and second formers. It is enclosed by an aluminium bonnet, whilst a "manhole" in the bottom of the fuselage gives access to the engine from underneath.

The cooling system is very efficiently carried out, and is made up of two long streamline-shaped "honeycomb" radiators, mounted one on each side of the fuselage. They are conected top and bottom to two tanks within the fuselage, as indicated in one of the accompanying sketches. On the back of each radiator is a shutter, which can be opened or closed from the pilot's cockpit. A neat and simple oilcooling radiator is also fitted; this is shown in one of our sketches, and consists of an extension of the oil tank next to the engine projecting through the starboard side of the fuselage, and having a series of tubes passing through it from front to rear. This projection also carries the oil filter and filling-cup. As pretviously mentioned, the fuel tanks are located in the compartment between the engine and the cabin. Petrol is delivered direct from the main tank to the carburetor through the agency of two windmill pumps mounted above the turtledeck and the tanks. There is, however, a small service tank, for emergency, let into the leading edge of the top centre section.

The estimated maximum speed of the B.A.T. F.K. 26 is 110 m.p.h., whilst the landing speed is about 40 m.p.h.



The B. A. T. four-seater biplane—A diagram showing the arrangement of the formers in the fuselage

Book Reviews

APPLIEM MECHANICS, Vol. 11, by Charlet

E. Fuller and William A. Johanton. This

column has been prepared primarily for

old Engineering in the Massachusetts Institute of Technology and is intended to
cover the fundamentals of the subject in
sa far as they may be required in subsequent work in structural and machine dequent work in structural and machine degineering practice. As preparation a student should have a knowledge of Differential and Interçal Calculus, the principles of Statics and Dynamics, and the
methods of determining centers of gravemethods of determining centers of gravesolids. Considerable attention has been
given to the logical development of the

subject and care has been taken to point ut the limitations of the different theories; emphasis being laid on the divergence of the conditions met in practice representations of the divergence of the conditions are deduced, and on modifications necessary, or advisable when the formulas are used under or advisable many working conditions. Some of the lication are physical properties, materials, analysis of stresses and strain, unform stresses and uniformly varying stresses to beams, defection of beams, continuous beams, combined stresses, general theory curved lars, etc. Price is \$4500, post paid.

GAS, GASGAINE, AND OIL ERGINES, \$90.

comprehensive book on the construction, operation and repair of all kinds of engines, dealing with the various parts in detail and the various types of engines and also the use of different kinds of fuel. This volume contains a valuable and complete gas engine glossary. Price \$13.5 post paid.

Gas Emaine Trougles and Installa-

GAS ENGINE INDUE CHATS, by Rathbus, A book that shows you how to install, operate and make immediate repairs and adjustment on all types of gas, asoline trouble chart for ready reference included therein. Profusely illustrated, Price is \$1.35, post paid. Procurable at the Aeronautic Library, Inc., 299 Madison Avenue, New York City.

THE DESIGN OF AEROPLANE FITTINGS

By E. S. BRADFIELD Formerly of Naval Aircraft Factory

In the testing of complete aeroplane parts, such as fusclages, tail units, wings, etc., it is shown very clearly that failure usually took place in the metal fittings or their attachment to wooden members rather than in the main parts, such as beams, longerons or wires.

neams, iongeroins or wires.

In starting the design of aeroplane parts, it is first necessary to have a stress diagram showing the direction and magnitude of the forces acting on the principal parts. From the control of the forces acting at a single point, where a metal litting is used to connect beams, struts and wires.

After finding the forces acting it is next necessary to resolve them into components acting parallel and perpendicular to the main part, as a wing beam. Having done this, the finding of the dimensions and design of the metal fittings is

and the control of the mean through the control of the mean tuning is A. A chart for determining the buckens of metal required in wire attachment lugs and also in the fitting is shown in Figure 1. The figures at the left bottom are the forces acting for the first of the first part of the first part

required.

Figure 2 is a chart for determining the bolt size. At the left is the force acting parallel to the grain of the wood. The graphs are the bolt sizes, and at the bottom is the wood thickness for both spruce and ash, when stressed at 3,500 to 5,500 nounds per sourse inch respectively.

Having the force acting and the thickness of the wood, we find their intersection, and the bolt size that this is on or below is the proper size of bolt.

ueuw is the proper size of DOIL.

A chart for finding the area of metal fitting required against the wood is given in Figure 3. At the left is force acting perpendicular to the grain of the wood, and at the bottom are the areas required both for spruce and ash when stressed at 450 and 1,150 pounds per square inch respectively. Having the force and going horizontally to the datum line and then down, we find the grae required on the wood.

Figure 4 is for determining the width of metal required in a in the force acting. The right band graphs are the tensile strengths of the metal used, and the left hand graphs the width of metal, and the left bottom figures are the thick-

Having the force, tensile strength and thickness, we go from the force up to the strength, then horizontally until we intersect the thickness and reading the graphs get the width required. Below is a table, Figure 5, giving the strength of 3½ per cent nickel steel bolts, both in tension and single shear.

Bolt Size	Strength in Single Shear	Tensile Strength at Th'de				
36	1000	800				
% No. 8	1500	1300				
% No. 10	2150	1800				
1/12 No. 12	3000	2500 3400				
3/4	4000					
50	6100	5400				
%	8800	7700				
3/40	118800	10500				
1/4	15500	13500				

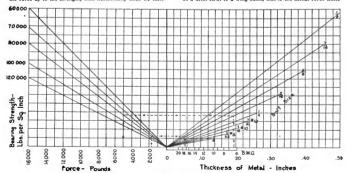
Figure 5

Figure 6 is a table that gives the minimum thickness that may be used for different areas of flat metal to have the necessary stiffness. The force is considered as acting at the center of area. When ribs or flanges are used to stiffen the part this data does not apply, and a calculation or test must be made to determine whether or not the fitting is stiff enough.

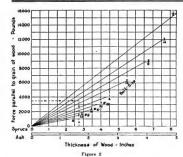
Thickness B, W. GIn.	Area.
16	31/6
14	5
13	8
36	12

Figure 6

An example will now be given of the use of the above charts. Figure 7 shows the forces acting at the attachment of a drift strut to a wing beam, that is the actual force times







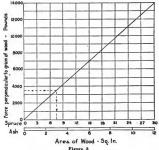
a suitable factor of safety. The beam is assumed 2½ in, thick. It is first necessary to find the size of the bolis E and F. mined by the area required on the wood to resist sliding of the fitting along the wing beam. As the fitting does not surround the beam, the bolis are effective for only half their length, or 2½ in, in all for both bolts. The force is \$500 pounds. Turning to Figure 2, we find that the minimum bolt.

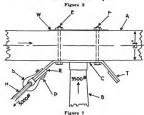
pounds. Turning to Figure 2, we find that the minimum nois size is \(\frac{\psi}{1} \) in. The force acting on the strut B is 3,500 pounds, which is transmitted to the fitting and by it to the beam. Referring to Figure 3 we set that for a syruce beam the area of the fitting should be \(\frac{\psi}{2} \) size, in, the this wear No. 12 gap metal

fitting should be 7½ sq. in.

From Figure 6 we see that for this area No. 12 gage metal should be used to get the required stiffness. It is now necessary to find out if this is thick enough to transmit the force to each bolt, which is 1,750 pounds. Following out the data bolt in Figure 1, we find that No. 17 gage metal would be thick enough, so we are well on the state side, as from stiffness use last to be made of No. 12 gage. It is apparent that otherwise No. 17 gage would have been used.

From a vuldy of Figure 7 it will be seen that the bolt E tratumits some force to the washer W. As the fitting is of fairly heavy material, we shall assume that two-thirds of the

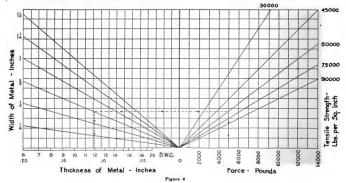




vertical component of the wire pull is transmitted to the washer W, or 2,500 pounds.

From Figure 3 we see that this requires an area of 5 sq. in.

under the bolt E, and from Figure 6 we find that No. 14 (Concluded on page 1184)



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DEVELOPMENT OF AN AEROPLANE SHOCK RECORDER

By A. F. ZAHM, Ph. D.

Bureau of Construction and Repair, Navy Department*

To meet the current needs of the aeroplane designing staff of the U. S. Navy, an aeroplane accelerometer was deneountered in flying and landing. An elaborate instrument of precision was not called for, but rather a device whose records could be obtained easily and read directly. For the scale drawings and early tests of the design here described the writer is indebred to his assistant, Mr. L. Crook, who first calibrated the accelerometer, then used it on a flying boat to measure landing shocks.

Fig. 1 pictures the instrument in course of development. It consists of many vertical styluses, or pointed rods, sup-ported individually by springs and recording on a single chronograph drum over which passes a continuous sheet of chronograph drum over which passes a continuous sneet or sensitized paper. For measuring upward accelerations the rods, which are all of the same mass, are pressed upward against stops by springs of graded intensity, while their pointed lower ends, or needles, are held within a few thou sandths of an inch of the chronograph drum. When acceleration occurs a certain number of styluses begin to record instantly, as the intensity of the force overcomes in succes-

sion stronger and stronger springs,

When preparing the instrument for any proposed measurement one sets the springs so as to meet any probable accelerations that will have to be recorded. By means of the sliding sleeves shown in the photograph the force of the springs can steves shown in the photograph life force of the springs can be adjusted so as to equal any multiple of the weight of a rod. To this end one applies in succession to each sylpus, by contact with a weighing scales, forces which are multiples or fractions of the whole faxed weight of the rod plus half the weight of the spring, while the springs are adjusted so as barely to support the rod against the stop. A single rod of brass weight salout 134 ounces, being 9/25 inch damnet: by 5 inches long.

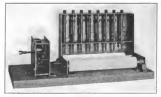
To prevent the needle from scratching or puncturing the

To prevent the needle from scratching or puncturing the paper it is cushioned against a spiral spring inside the holder, or vertical rod, within which it can otherwise slide freely, representations of the result of the spiral spring spring spring spring against the upper end of the small holding and adjusting screw. This screw can, by rotating, raise or lower the setting of the needle, and is securely fixed in place by the jam must offer an analysis of the spring spr and thicker, for a test has shown that .05 ounce pressure of

the needle causes a clear trace.

In the position and adjustment, shown, the present instrument records only upward accelerations, but by inversion can, without further adjustment, record downward accelerations, provided account be taken of the reversed direction of gravprovided account be taken of the reversed direction of graying. Thus, if when upright, the stylus exerts on the stop a pressure nw, inverted it exerts (n-2) w; and hence records accelerations ng (n+2) g, w being its weight. Without inversion the instrument also records negative accelerations if the styluses be pressed downward against their stops. Also in its upright position the instrument records both positive and negative accelerations when the springs are set so that some styluses are pressed upward and others downward.

Reprinted from the Franklin Institute Journal.



The special stylus shown on the right of the photograph is provided at its upper and lower ends with thin cantilever springs which prevent it from rubbing against the guide plates of the containing box, and at the same time hold the rod upward against its stop in the manner described for the spiral springs. An instrument with such cantilever, or anti-friction, springs could be used to measure horizontal as well as ver-

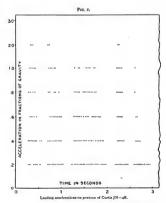
tical acceleration

In the form here shown the instrument is provided with 6 feet of paper driven by an alarm clock at the rate of 2 inches teet of paper driven by an alarm clock at the rate of 2 inches per second for such accelerations as are found in aeroplane experiments. This rapidity is essential in order to separate and clearly disclose landing shocks and structure vibrations; for it is usually the short hammer-blow shocks of a few hundredths of a second duration which most stress the under parts of an aeroplane in alighting on land or water.

In action the instrument appears to be fairly instantaneous and free from the oscillations found in a spring accelerometer and tree from the oscillations found in a spring accelerometer whose recorder has a considerable displacement. Thus each needle records without interruption a definite continuous acceleration beyond a certain intensity, but instantly ceases recording when the acceleration falls below this amount. It can also simultaneously record long and short accelerations. For example, engine tremors superposed upon an air swell cause a needle to make a dotted trace, the length of the trace representing the duration of the swell beyond a certain trace representing the duration of the swell beyond a certain intensity, and the distance between dots representing the serves to standardize that of the paper, and a known paper speed that of the engine. The aggregate tracings of all the needles form a shaded diagram whose contour is a way. An example of typical records taken on a seaplane is presented in Fig. 2 of this report. The farther stylus, which has its restraining spring adjusted to record upward accelerations.

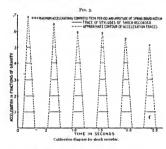
ils restraining spring aquissed or evord upward accelerations of twice gravity, has made a few instantaneous traces sepa-olitic traces and the service of the service of the service of the service has made long traces with short blanks. Both records are dotted, showing engine tremors. Feeble accelerations were expected, otherwise a more suitable setting of the springs would have been made. They should have been graded to tenths in the region of two gravities.

Fig. 3 gives an acceleration record of an approximately



Fir. 1

simple harmonic motion, somewhat damped, made with the instrument screwed to the end of a vertically birbaring spring-board clamped in a firm vise on a not very firm table, and with its styluses set only for positive acceleration. Plotted on the same diagram, as a line of small circles, are the simultaneous maximum accelerations of a needle inserted in the end of the spring-board and playing on a sheet of smoked paper moving steadily past it. The line of circles is a "damped" harmonic with a perceptible "overtone," and matches the damped acceleration trace taken simultaneously, all records being equally distant from the face of the vise. The actual tracing of the spring-board tip is given in Fig. 4, and the method of computing from this the maximum accelerations, which are indicated by the circles in Fig. 3, is developed in the following paragraph.



Without rigorous precision the general equation to the vertical motion of the spring-board tracing point may be written $\ddot{s} + as^2 + bs + cs = e$

in which s is the displacement, at any time t, from the point of rest under gravity, and αs , b, are retardations due to the air resistance and internal friction of the vibrating system. The maximum acceleration for any one vibration occurs when s = o, and may be written from the equation $\frac{s}{s} + c = \frac{s}{o}$.

It is
$$\ddot{s_i} = -cs_i$$

in which s, is the momentary amplitude. Since the damping is small, s, can also, without material error, be written in the more familiar form

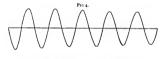
when n is the frequency. Now, since \hat{n}_n is approximately recorded by the acceleration styluses, and \hat{n}_n , n_n are found in the record of the wibration stylus, the one record can be checked with the other. This method was used in computing from the trace of the spring-board's motion, the accelerations indicated by circles in Fig. 3.

The acceleration records are fairly trustworthy as far as they go, but lack continuity, like the markings on a yardstick. To disclose accurately the maximum acceleration in any shock the adjustment of the springs must be close-graded. Thus, if a maximum acceleration of twice gravity be recorded by styluses graded to tenths of gravity, the greatest possible error is presumably one-tenth of gravity, or 5 per cent of the quantity recorded, while the probable error is 2½ per cent. Still closer estimates can be made by sketching in the contour of the traces. The free play of the styluses between their stops must, of course, be kept small.

Closer agreement between the two sets of superposed values

In Fig. 3 would ensue if the clock ran uniformly; if the paper were uniformly thick, instead of being spliced; if the needle points were set 0.001 inch from the paper, instead of 0.012 inch; and if the styluses were given less play between their stops. These adjustments would be made in refining their stops. These adjustments would be made in refining where accurately disclose the acceleration, unless made with unumerous styluses in close-graded adjustment. At one point, as we have a subject of the property of the proper

For the immediate measurements in view it was thought unnecessary minutely to calibrate the shock recorder to a close-grade scale by experiment. Continuous recording instruments are in the market, such as the R A F photographic accelerometer, or in development, such as the Sperry mechanically recording accelerometer, and these may be had in time. The present instrument has served a passing need, and



TIME IN 5 TWO OF SECONDS.

Trace of tip of vibrating sering board used in calibrating accelerometer.

may prove useful for disclosing hammer-blow shocks too sudden to be faithfully recorded by accelerometers of another type.

For a comprehensive field laboratory study of the accelerations throughout an aeroplane it may be well to measure simultaneously the shocks in the undercarriage, the body and the wings. This can be done either by placing individual recorders in those parts, and synchronizing them, or by placing shock receivers there and recording on a central chronograpb. The present instrument, or a simpler one consisting of plane har springs, could be used as a contact maker in various parts of an aeroplane to operate recording magnets at a central drum. Such an apparatus can easily be arranged, and may be expected to record with about the promptness of a ballistic or an astronomical chronograph.

For instantly indicating to the pilot the comparative stressting in his machine a number of simple har-spring contact
makers of graded strength can be coupled to a row of tiny
electric lamps on the instrument board. These would brighten
successively, and indicate by their various colors, positions, or
markings, the degree of stress put upon his craft. A tentative instrument of this kind has been tried incidentally to the
present study. Such cantilever styluses, or contact makers,
have the simplicity and compactness of a row of piano keys,
but are not preferred to the endwise-moving styluses because
they are more affected by angular accelerations about their
centers of gravity, or points thereabout, than are the rods
used in the present instrument. Ohviously the contact points
could be used with a smaller gap than have the needles
recording on paper.

Without its base the present instrument, whose case measures 9 inches by 6 inches by 1.5 inches, weight 8 pounds, being made almost wholly of brass. By using aluminum, where practicable, the whole weight can be reduced to about 2 pounds. In this style the clock would form part of the case, and the whole could be screwed to the instrument board of an aeroplant.



NAVAL and MILITARY · AEDONAUTICS ·



Washington, D. C.—According to a statement issued by the Director of the Air Service, leading ship No. 1, Flight "B" Eighth Aero Squadron, with Lieutenant Rex Stoner, flight commander, and Captain D. W. McNabb, commanding officer, as passenger, left Kelly Field for border duty at Laredo, Texas. Ships were flown in Vec formation entire distance of one hundred eighty miles.

The following units are now operating as border patrol flights:

McAllen, Texas—Headquarters and "A" Flight, 8th Aero Squadron.

Laredo, Texas—"B" Flight, 8th Aero

Squadron. Marfa, Texas-"A" Flight, 11th Aero

Squadron.

El Paso, Texas—Headquarters 1st Bombardment Group. Headquarters and "B" Flight, 11th Aero Squadron.

Headquarters and "B" Flight, 96th Aero

Squadron. Douglas, Ariz.—"A" Flight, 96th Aero

Vacancies to Be Created by Legislation

to Be Filled by Emergency Officers Washington, D. C.—The War Depart-ment authorizes publication of the fol-

lowing information:

In filling such vacancies as may be created by future legislation reorganizing the Army, it is the policy of the War Dethe Army, it is the policy of the war De-partment to select appointees from among persons who served as emergency officers during the war with Germany. Equal consideration will be given to all applications, whether the applicant is still in the service or necessarily has been discharged in the process of demobilization. No ap-pointment will be made without a thor-ough and satisfactory final examination. All appointments will be provisional for a period of two years, during which time the appointment may be terminated should the provisional officer be found unsuitable for permanent retention in the service. Examinations will not of course. be authorized until the enactment of legis-

lation creating vacancies in the permanent military establishment. A previous announcement of the War A previous announcement of the war Department permitted the erroneous in-terpretation that preference would be given to emergency officers still in service in preference to discharged emer-gency officers.

Sales of Surplus Supplies

Washington, D. C.—The present status of surplus supplies is announced in a statement prepared by the Statistics Branch of the General Staff. The figures Branch of the General Staff. The figures include all sales made up to August 15. The estimated surplus on January 1, 1919, chargeable to the Department of Military Aeronautics was \$\$50,000,000 or 20 per cent, has been sold. \$10,300,000 or 27 per cent, of the Bureau of Aircraft Production's \$62,000. 000 surplus has been sold.

lowing information: There are scattered throughout the service many kodak films and plates, depicting the activities of the army in the United States, abroad and in our foreign possessions. This material covers a period of many years, extending back to dates before the activities of the photographic section of the Signal Corps commenced. These photos are of great value to the War Department for historical purposes and, incidentally, for the use of the recruiting service or other instrumen-talities of the War Department, with a view to preserving these photos and the official use of them as the War Department desires, the Adjutant-General rement desires, the Adjutant-General re-quests co-operation of all officers in the service. Films, plates and prints depict-ing activities of the army should be for-warded to the Historical Branch, War Plans Division, General Staff, with such descriptive matter as will identify the photos as to personnel, military unit, place and date.

Aviation Camp to Be Established in Arizona By Air Service

Douglas, Ariz.-According to a state-ment appearing in the local press, it is stated that a permanent aviation camp is to be constructed east of Camp Harry J. Iones. The decision is said to have been reached by a board of officers examining possible sites.

Thirty-five buildings will be constructed. In addition to the enlisted personnel, it is said ahout fifty officers, including flyers and ground forces, will be stationed at the field

Aviation Construction Work in U. S. Only 1 Per Cent of Army's Total Of the \$818,000,000 expended by the

army for construction purposes, it is stated that only \$8,000,000, or 1 per cent, was used on aviation and signal corps projects.

Aero Squadrons on Duty at the Border
Washington, D. C.—According to a statement issued by the Director of the "Carelian Behaling shin, No. 1. Flinhs ment authorizes publication of the following: According to the Statement authorizes: publication of the following:

Aero Squadrons on Duty at the Border Photos of Army Activities

Washington, D. C.—Acting Secretary Washington, D. C.—Acting Secretary ment authorizes: publication of the following:

The Navy Department has approved the change of naval aviator device as follows:

lows:
The present gold pin with double wings based on the shield and anchor will be worn only on wash summer uniforms. The winter uniforms will carry a similar device of gold embroidery. Provision has been made by the new regulation which designates student naval aviators and flying mechanicians. The student wears a pin similar to that of the graduate aviator, with the exception that one uate aviator, with the exception that one wing is removed, leaving a device similar to that worn by observers abroad. Regu-lar members of seaplane flight crews among the enlisted men will wear a pin similar to that of the student naval aviator, except that it shall be of silver.

This change is made with the belief that there should be a distinctive insignia for the graduate and student naval aviators, and further that the flying mech-anician should also be entitled to wear some mark of distinction.

New Reserve Military Aviators Named Washington, D. C.—The following-named officers, having completed the re-quired tests, are rated as Reserve Military Aviators, to be effective from the tary Aviators, to be effective from the date set after their respective names: Captain Roy N. Francis, June 10, 1917; Second Lieutenant John M. Coleman, July 13, 1919; Captain Herbert G. Knight, July 24, 1919; First Lieutenant Francis T. Murphy, July 24, 1919; Second Lieutenant Verne M. Monticue, July 24, 1919; Second Lieutenant Verne M. Monticue, July 24, 1919; Second Lieutenant Alfred L. Coe, July 24, 1919; Second Lieutenant Patried L. Coe, July 24, 1919; Second Lieutenant Alfred L. Coe, July 24, 1919; Second Lieutenant Alfred L. Coe, July 24, 1919; Second Lieutenant Patried L. Coe, July 24, 1919; Second Lieutenant 24, 1919.

24, 1919.

Be Returned from A.E.F.
Washington, D. C.—According to a statement from the Statistics Branch of the General Naff, there remain 12830 short tons of Air Service property to be returned from A.E.F. This is 7.2 per cent of the total army equipment still overseas.



A French S.E.A. two seater biplane which climbs 17,000 feet in 21 minutes and has a speed of 129 miles an hour at 6,500 feet



FOREIGN NEWS



Air-Cooled Bristol Engine Tested

Aurt-tooled Bristel Engine Tested

London, England.—A new Bristish scott meshine powered by a new type of Bristol engine received its preliminary tests recently. The eagine develops 450 horsepower. It is of nine cylinder type and weighs but 636 pounds.

\$320,000 in Prizes to Be Offered by British Government

London.—The British Government will offer prizes amounting to \$320,000 for aerial competition, it was announced by an Air Force officer in the House of Commons.

100,000 Yen Prize for Japanese Cross Country Race 100,000 feer free for Japanese Cross Century nace Tokio.—A eross country race for price stotalling 100,009 pen (\$50,000) months of July and August, according to inform the first price is 30,000 yers, the second 20,000 yers and the third 10,000 yers. The route is from Kagoshima to Sapporo. The landing piaces and distances are as follows:

| Ragoshima-Fukuoka | By railway. | Ragoshima-Fukuoka | 170 miles | Fukuoka Iliroshima | 190 miles | Ilirosh.ma-Okayama | 97 miles | Okayama-Okaska | 114 miles | Okaka Toyohashi | 160 miles | Tokyo-Sendai | 215 miles | 215 miles | 225 By air. 130 miles 142 miles 75 miles 86 miles 120 miles

Tokyo-Sendai
Toyohashi-Tokyo
Sendai-Morioka
Morioka-Aomori
Aomori-Sapporo Total 1,577 miles 1,201 miles

Total 1,201 miles 1,201 miles 1,201 miles 4, specified tent flight is required before the contestants can participate. (Only Japanese avasture may compete.

An specified tent flight is required before the contestants can participate to who by a foreign-ball typhas and a.30 per cent increase in the price is wen by a foreign-ball typhas and a.30 per cent increase in the price if the machine is cettrely of Japanese construction, with Compensation for excitents or imprise sustained foring the contest of machines and for expenses will be advanced to say competent switzer.

Aerial Competition in Fortugal

Lishon.—An arrial contest over a course from Lisbon to Oporto to Vianna to Lisbon is being organized as a test for the contemplated flight from Lisbon to Guinea.

Regular London-Paris Acro Passenger and Freight Service Started

Ragular London-Paris Arvo Passenger and Freight Service Started London—An owe fright and possenger aerophia service between London and Paris was inhaqurated on Angust 5.

24.5, completing the round trap in five and three-quarter bours. Two firms have garried daily slights simultaneously, charging \$75\$ to \$100 to be exerbitant. Great hopes are held out that these fares will be reduced as operating conditions become better, and with bugger, better Three phases carry one owner of mail for \$11. As it is possible to send \$5,00 words for this sum, the rate is considered chem, Cable will some better the construction of the condition o

French Aviator Flies Twice Under Var Bridge

Nice, France.—Aviator Mancon, with a local newspaper reporter as a passenger, twice flew through the arch of the Var River hridge on August 24. The treh is 66 feet wide and 26 feet high.

New Zeppalin Passenger Carrier in Successful Test

New Zoppalia Passanger Carrier in Successful Test
Berlin—A new Zoppalia narbin, on its maiden trip from Friedrichablem to Berlin, covered the 435 miles in a little more than as
mun speed of 745 miles a hour.
The builders of the new type machine have discarded the familiar
The builders of the new type machine have discarded the familiar
testion. The Booleance is 3/50 feet long and accommodates thirty-fee
passengers. The aircraft is to go into a daily service.
Twentyone passengers, among them there women, made the initial

1,000 Horsepower Aeroplane Engine Teated in England

Wolverhampton, Eng.—An experimental aeroplane engine develop-ing between 900 and 1,000 hors-power was put under test here recently. The 12 cylinders are arranged "V" fashion and the weight is less than 2,000 pounds. Special aeroplanes are to be constructed for the engine.

Prizes Offered for Valve Design in Germany

The Society of German Aircraft Constructors, in order to standardize design and produce more efficient models has offered three prizes for gasoline valves for aircraft engines. A prize will be awarded for the best design of each of the following types: the ordinary trough type, the three way type, and a threeway by pass type.

The Third Annual Aeroshow at Taliedo

Milan.—The bird Annual Aeroshow at Isliedo
Milan.—The bird Milan Aeroshow at the Talledo Flyring Ground
consists of a series of highly interesting exhibits, consisting chiefly of
field. The journey is made at three times the speed of the railway at
four times its cost. Lunch is included in the 300 line fare.
No fewer than cight flying machines are on exhibit, exclusive of

lighter-than-air vessela. These eighty may be divided into sections of handre and modern, war mad peace restle, and a section that contains handre and modern, war mad peace restle, and a section that contains handre the peace of the section of th

Spanish Air Routes to Open Soon

Madrid-Regular mail and passenger service between Malaga and Mehlin (Morocco), and between Bareelona, Alicante, Rabat (Morocco), Representatives of a Prench aerial transport corporation are visiting Seville to complete arrangements for a Paris-Bordeaus-Madrid-Seville-Aligers service.

Handley Pags Service Between Damaacus and Bagdad Cairo, Egypt—A number of British officers have left here with a Handley Page biplane to inaugurate the Damaacus-Bagdad air line. The distance is 500 miles, a part of which is over the Syrian Desert.

185,000 Aircraft Workers in France

A Larger Caproni Triplane

Rome, Inly—A larger and speedler Captoni tripules is described in new disactors may be a speedler captoni tripules is described in new disactors. The speedle captonic control of the captonic c

Fiat Doubles Capital

Turin—The capital of the Flat Doubbee Capital Communication and the Flat Company has been increased from 10 million. The increase has been made by the creation of 500,000 shares of a nominal value of 200 lirar each, to be offered in option to the present shareholders at par, at the rate of one new share for each This increase in capital has been decided on in order to transform and modernize many of the present shops with a view to efficiency and economical output and the consequenty lowering of the price.

and economical output and the consequency owering of the process. Other work to be carried out comprises an increase in electrical power for the rolling mills and steel works held by the Fist Gompany and producing exclasively for the Fist at motor factories. An up interests either in Italy or abroad in order to prepare the automobile markets for commercial expansion.

Air Force Cadet College to Open February

The Air Air and Loads closing to those reservant.

The Air Ministry announces that a Royal Air Force Under College for be true with the open of the College Air Force will be opened east February.

The place where the college is to be established will be announced shortly. The number of cades to be admirted on the opening of the Administion will be by competitive examination. The Air Council fully considered the alternative of administor by nonlinear combined with a qualifying intrary examination.

Alliance Plane in Fast Flight from England to Spain

London—Leving in serordrom at Action at 7 and 10 Jun 17 to London—Leving in serordrom at Action at 7 and 10 Jun 17 to London—Leving in serordrom at Action at 7 and 10 Jun 17 to London—Leving in the Control of Spain as a memoral of the control of the Control of Spain as a memoral of the control of the Control of Spain as a memoral of the Control of Spain as a m

Aerial Mail for India

London-"A detailed Assessing and the string post service in the list is being considered by the Government of Holds," sensor, H. G. Perry, the "Daily Express" correspondent at Bombay, "A beginning in which the Governor of Bombay is taking a very lively interest. A service will probably be in full using early next year. If will find up the control of Bombay is taking a very lively interest. A service will probably be in full using early next year. If will find up the control of the



ELEMENTARY AERONAUTICS

MODEL NOTES

By John F. MSNahon 466



for is very simple

more is very simple.

The general arrangement of the motor and tank assembly is shown at The tank should be painted a dull black for effect.

The tank should be plainted as the first of the first point, such a first point point

PLAN TAIL SKID MAIN LANDING WING BRACE OR

-In Flight -

strips of prass bent around the cylinders and fastened with thread and

The tank is fastened by drilling holes in the frame and by inserting

The tank is fastered by drilling holes in the frame and by inserting he ends of the holes projecting from the airc of the lank to the star. In the control of the control of the control of the control of the The front Insuling chassis in made up of unbribling the control of the The front Insuling chassis in made up of unbribling the Where the The front Insuling chassis in made up of unbribling the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control of the control of the control of the con-trol of the control o

theread and give.

The wheels are of cork or wood 2 in, in diameter. The tail skid
The wheels are of cork or wood 2 in, in diameter. The tail skid
The rar wheel can be smaller in diameter and in also of cork or
wood. The wings should be made as light as possible and are built
up of hambon arrips and dowed sates 3/16 in, in diameter. They are
too surface and then obgod.

The main upars of the wing should be planed to a half round
The tailing edge of the wings in formed by arretching arrong lines
thread from rith to rith as tight as possible. When the ulli, is fastened
in place it will form what is known as a feathered edge and is very

The main planes have a total spread of 54×8 in.; chord elevator is $\times 4$ in. When constructing the elevator the center rib runs to e rear spar only, to allow the plane to set at an angle of incidence 18 x 4 in. When c the rear spar only, to to the line of flight.

to the line of flight.

The python or brace over the main planea is made of thin steel wire and fastened at the point aboven in the drawings. When ready to fly the model be sure it is ablanced properly. It is better to set the entering edge of the plane about 3 in. back of the center of gravity. The elevator can be moved back and forth according to the glide.

It is better to start the model from the ground rather than from the hand, as it is almost impossible to spin the propeller, turn on the air and throw the model at the same time without a chance of mishap. air and throw the mooet at the same time without a enance or missap.

The model builder can construct a sort of trigger arrangement for turning on the air, such as an arm soldered to the air "shit off" and a spring fastered to the tending to hold the valve open; to close, a sort of dog is fastered and when pressed by the finger it moves away, allowing the arm to saving back to the open position.

I might call attention to the size of the propeller. This should be from 12 to 16 in. in dismeter, but the proper size can be determined by experiment.

The landing chassis must be made long enough to hold the model roperly the correct distance from the ground to keep the propeller properly the correct distance from striking when getting off.

Finghts of compressed air models vary. Some enquires I have made blowed on leakage of air an observation of the complete and the same aboved on leakage of air and the model would not so as well when any that the engine that leaks is the best but I do believe that if the model builder is unfortunate enough not to make his apparatus air tight he can still get some reward for his work.

signt ne can atti get some reward for his work.

Some pretty scale models ean be made powered with a compressed
air motor. The famous Continental Aircraft Company's pusher is
shorter and larger in dismerter, takes the place of the body and
resembles it a great deal. Drawings of the Continental machine
appeared in a previous issue of Atraiat. Acr.

A model powered with a compressed air motor constructed by R. C. Hansen of the Pacific Coast Model Aero Club



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has physically, At times it has a paintologic, at times inertay a psychologic foundation. It arready has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Work for Aviators

Only statesmen of the loftiest vision can investigate high prices,-Brooklyn Eagle,

Hard of Hearing

Village Constable (to villager who has been knocked down by grape juice bottle dropped from an aeroplane)—You didn't see the number, but could you swear to the plane? Villager—I did, but I don't think 'ee 'eard me.

Starting It All Over Again

"You don't call me a 'cutie' any more, "No, girlie, that word is too reminiscent of life in the trenches,"—Manchester Evening Gazette.

As the Trans-Atlantic Flying Boat Takes Off

On her first trip to Nantasket, little Bess remarked as she looked over the side of the flying boat: "Mama, they put too much bluing in this water.

Which reminds us of another tot who exclaimed ou seeing the wake of the flying boat: "Oh, look, mother, the boat is losing all its soap."—21st Century Chronicle.

Just Before Flying Over

"So this is the first time you've ever seen the ocean," said

her escort,
"Yes; the very first time."
"And what do you think of it?"
"Ah!" she sighed in ecstasy, "it smells just like oysters."— Boston Transcript.



The Pop and the Dirigible Hangar-Fontaios Fox in the N. Y. Globe

Long Range Archies

The mere man, desperately seeking for some dinner-table gossip—Shooting stars is the great sight this August.
The fairgst (if not the brightest) of her sex—Oh, really, I'd no idea our anti-aircraft guns carried as far as that.—

Seeing Is Hearing

Sergeant Major: "Now, Private Smith, you know very well none but officers and non-commissioned officers are allowed to walk across the grass." Private Smith: "But, major, I've Captain Graham's oral

orders to-Sergeant Major: "None of that, sir. Show me the cap-tain's oral orders. Show 'em to me, sir."—The Veteran.

Sandy Was a Carey Lad

"How was it you never let your mother know you'd won the V. C.?" "It wasna ma turrn tae write."—Philadelphia Record.

The Pilot's Farewell to the Old Machine

We've had many a flight together in fair and stormy weather, But we've somehow always managed to pull through, And we gave the Huns' Mercedes a replica of Hades, And we've let the Albatross have something, too,

As we sent them on their death-dance, Their fatal, fearful death-dance, When we fought them up amongst the clouds of blue.

But I thought that we'd go under when they shot your struts asunder

asunder
On that morning not so very long ago,
But, thanks to God Almighty, we both of us got "Blighty,"
And we lived again to battle with the foe.
Oh! the nightmare of that nosedive,

That spinning spiral nosedive,
But we saved ourselves before we crashed below.

Now they say you're out of date and it's simply tempting Fate.

Now they say you're out of date and it's simply tempting And to-morrow I've to fly a new machine in all its pristine glory, which has yet to make its story, Not like you, old bus, you weteran has-been, With your mass of scars and scratches, Your honored scars and scratches, 'Tis only you and I know what they mean!

How I almost started sobbing when I heard your engine throbbing,

That embodiment of joyous life and soul! That responded in a second and on whom I always reckoned, And never once my confidence you stole.

They may give me any new 'bus, A spanking, brilliant new 'bus, But 'twill never be your equal to control.

So your flying days are ending, and I s'pose they'll soon be sending

You home again to mercilessly scrap, tou nome again to mercilessly scrap, But now the war is over and I live again in clover, I'll dream, as I've come through without mishap, For aye of you, my hero, My own unbeaten hero,

And thank you dearly once again, old chap.

E. Duncan Doring, in Flying (London).



EVERY FIRST CLASS AEROPLANE REQUIRES A RETRACTABLE CHASSIS

The Pomilios' latest data are given in this book



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In 1918, by special request of the United States Government, they came to

this country to assist in an aircraft production

AIRPLANE DESIGN

By OTTORINO POMILIO

403 pages, 6 x 9, illustrated, \$5.00 net, postpaid

The publication of this book now-when the airplane industry is shifting from the design and construction of military types of craft to that of pleasure and commer-

cial types—should go far toward replacing by scientific procedure many of the "cut and dry" methods now used. This is the first book to be published in this country which presents in detail the application of aerodynamic research to practical airplane design and construction.

Examine it for 10 days FREE

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Aero Novelty Timepiece



High Grade 8-Day Clock

Mounted in Conventionalized Propeller Design Suggesting Miniature Aeroplane

191/4 inches long 6 inches high

Price \$15.00 Prepaid.

Distinctive, Timely and Unique

Marks the Flight of Time

AMERICAN PROPELLER & MFG.CO.

BALTIMORE, MARYLAND, U.S.A.

(Concluded from page 1176)

gage is correct to use for the washer. The tensile force on E is a maximum of 3,500 pounds, and from Figure 5 we find that a 3/6-in. bolt has a strength of 7,700 pounds, so that it is amply strong.

The wire H exerts a force of 5,000 pounds on the fitting. Turning to Figure 4, we see that if the tensile strength is 60,000 pounds, and the thickness No. 12 gage, the minimum width is 34 in.

width is \$\frac{1}{2}\$ in.

For the war of which has a diameter of \$f/6\$ (in. It is apparent that a washer must be spot whedd or brased onto the fitting at this point to take the force acting. To determine the total bhickness of metal we refer to Figure 1, and find the which leaves \$K\$ for the washer, and as \$K\$3 is \$N_0. 14 gage, that is the metal we shall use for the washer.

The following facts from which to lay out this fitting have

therefore been determined:

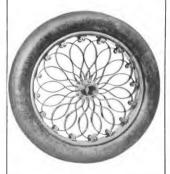
	Plate C
Area o	ess
	Washer R
Thickn	ess
	Washer W
Thickn One-ha	ess
	Bolts E and F
Diamet	er
	Pin P
Diamet	er

From this data it is an easy matter to design these parts and be reasonably certain that no changes will be necessary due to weakness. Although as an extra precaution a sand load test of the complete machine should be made.

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Are daily gaining in favor with manufacturers and pilots of aircraft because:

They Absorb Shocks
They Are Stronger
They Are More Reliable



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(Continued from page 1167) (j) 3 Maximum total 45. Behaviour afloat (Rule 22) (a) (b) (c) 6. Maximum total 18.

High speed (Rule 5)

For each knot in excess of required Low speed (Rule 5) No Maximum For each knot below the required maximum, 1

Mooring out lest in fair weather (Rule 8a)

For each complete 5 minutes less than the hour For each compete 5 minutes tess than the hour allowed from the completion of the 24 hour period, to the moment when the machine leaves the water, 1 mark.

Mooring test in moderate weather (Rule 8b)
For behaviour of machine during test, maximum marks 5. For condition of machine at end of test, maximum marks, 5.

Method of fitting parachute (Rule 24)

Maximum marks 5. 27. With reference to Rule 6, when carrying out alighting 27. With reference to kule 6, when carrying out augustus and getting off tests, machine will start with the load of minutes. If they have not carried out their tests by the end of that period, they must alight and fill up again, 28. The type of propeller used on any machine must be the same for all the lests. 29. Full load will include: Instruments as under: Rev. counter Aneriod Air speed indicator

> (when necessary) (when necessary

> (when necessary)

Compass Watch Turn indicator Bearing plate Sextant

Air pressure gauge Oil pressure gauge

Radiator thermometer

Petrol and oil sufficient to fly 450 nautical miles at 1,000 feet. In addition, a load of 1,000 lbs., to include passengers

if carried and lifebelts and parachutes, but not in-cluding crew or any gear specified in Rules 8a and 13. 30. Petrol and oil for the tests and, as far as possible, accommodation (at owner's risk) for the machines will be

accommodation (at owner's risk) for the machines will be supplied free by the Government. 31. The Judges shall have the right to disqualify any machine which is very seriously defective in any respect. 32. The Judges shall have the right to put up a service pilot to fly any of the machines, should they consider it plot to fly any of the machines, should they consider it All tests will, however, be carried out by the entrant's pilot. All tests will, however, be carried out by the entrant's pilot. 33. Durine or on compolition of any flying test. If it is

All tests will, nowever, be carried out by the entrant's pilot.

33. During or on completion of any flying test, if it is necessary to effect any repairs to the machine after alighting, it will be considered to have failed in that particular test. This does not apply to cases where the machine is by the judger instructions being flown by a pilot other than the

judges' instructions being nown by a puot outer than the entrant's pilot.

34. An entrant may enter more than one type of machine.

35. If a machine is wrecked during the competition, it may, at the discretion of the judges, be replaced by another, but the replacement machine must carry out the whole programme of tests

36. The decision of the judges shall be final in all matters

affecting the competition.

37. The Government does not accept any liability in respect of accidents during the competition, whether resulting in injury to personnel or damage to the machine (except as specified in Rule 32).

38. The Government reserves the right to adjourn the com-

39. The Government reserves the right to withold any or all of the prizes if, in the opinion of the judges, no real advance on existing designs is shown.

40. The Government will, if the entrant agrees, buy the machine winning the first prize, the design to remain the property of the manufacturer. The maximum price payable under this head will be 48,000.

41. The following prixes are offered:

3rd prize..... 42. Entries to close December 31.

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Washington, D. C .- The War Depart-ment authorizes the publication of the following information:
It has been brought to the attention of

the War Department that silver stars are being worn on Victory ribbons in some cases for citations which under army regcases for citations which under army reg-ulations are not sufficient authority for that decoration. The conditions which must be fulfilled for wear of these silver are set for the paragraph Boy. A. E. year are requirementally as a superior of the paragraph boy. A. Silver star cannot be worn unless all three of the following conditions are fulfilled: (a) The citation must be published in orders from beadquarters of a force com-orders from beadquarters of a force com-

manded by a general officer. A special citation certificate does not carry with it a silver star, neither does a citation in orders from headquarters of a force commanded by an officer below the grade of general officer, even though it may be appropriate command of a general officer.

(b) A silver star cannot be worn for any citation for which a Medal of Honor Distinguished Service Medal or Distinguished Service Cross was awarded

guisned Service Cross was awarded.

(c) The citation must be for gallantry in action. This does not mean extraordinary individual heroism, but it does require that the acts for which awarded were performed in a gallant manner and under hostile fire, and the citation must distinctly show such to have been the case

All officers and enlisted men wearing silver stars will present to the commanding officer of camp, post or station, for approval, copies of citation on which their claim is based. Cases which may be in doubt will be forwarded to the Adjutant

Silver Star on Victory Ribbon Permitted General for decision. Copies of all approved citations of officers will be forwarded by the commanding officer, noting his approval, to the Adjutant General for file with officer's efficiency record; those of enlisted men will be filed with the individual's service record

Commercial Air Routes Throughout Germany rcial Air Routes Operating

In spite of the disturbed internal conditions in Germany, a determined attempt is being made to establish aviation on a permanent commercial basis.

permanent commercial basis.
From reports recently published in
Flight (London) it appears that a fairly
large number of passenger services have
been running for some time, mostly radilarge number of passenger services have
been running for some time, mostly raditial rat in operation in Weimar, Frankfurt, Leipzig, Warnemunde, Hanover,
Westphaila, Hamburg and Brealau. There
are also services between Weimar and
Frankfurt, Hamburg and Warnemunde,
Leipzig and Weimar and Hanover and
Tille Berlin, Weimar route opened weight

The Berlin-Weimar route opened as early as February 5. The results for the period up to the end of the month showed that 120 flights took place, of which all but eighteen were successfully terminated. There were no accidents. The Berlin-Hamburg route was opened on March 1 Hamburg route was opened on March 1 and on this service also the results were considered satisfactory. In spite of bad weather and interruptions owing to rouble to four per day, were accomplished and a total load of no less than 3,737 kilogrammes were carried. The average duration of each journey was 2 hours 11 minutes, with a record trip of 1 hour 1 minutes. This and other services were utilized for the carriage of mails, and on

this route only 6.1 per cent, failed to get through owing to bad weather and had to complete the journey by train.

All these services are operated by the Deutsche Luft Rederie, a combine of vari-

ous German aeronautical firms.

ous German aeronautical hrms.
Return tickets are issued and are valid
for a period of thirty days. Flying ldi
and motor transport to and from the aerodrome are provided and are covered by
an inclusive charge of which the following are representative: Berlin-Hamburg: ing are representative: Berlin-Hamburg: single, 450 marks; return, 700 marks. Berlin-Breslau: single, 500 marks; return, 750 marks. Berlin-Weimar: single, 450 marks. Serial tickets available for 10 flights on any of the routes operated by the combine are issued at 3,000 marks. These tickets are transferable, and work out at an average reduction of 20 per Luggage is carried free of charge, cent. but the total weight of passenger—who is carried at his own risk—and baggage mbined must not exceed a certain lim Mails and parcels are also carried by the company, which is working it conjunc-tion with the Hamburg-Amerika line, through whose offices bookings may be effected.

Apparently the railway troubles have reacted favorably on aerial transport and a considerable increase of traffic has been caused. On the Berlin-Weimar route, which appears the most popular, the number of flights from February to the end of April was 538, while between Hamburg and Berlin from March 1 to the end of April there were 262 flights.

It is also of interest to note that a further fusion of interests of the various already existing commercial aviation companies is being organized under the direc-tion of the Sablatnig Aircraft Factory and the Luftfah G.m.b.h.





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